

FLIGHT

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The Fire Danger

IT is natural (and, indeed, inevitable) that following upon the recent air accidents, in some of which fire has occurred, the question of means for reducing fire risk should be discussed. It is equally natural that in this connection the Diesel engine should be mentioned, and that pleas for the immediate development of this type of power plant for aircraft should be advanced.

At present the position of the Diesel or compression-ignition type of aero engine is that the United States of America, France, Germany, Italy and Britain have all done a considerable amount of development work, and in each of the countries mentioned the flight stage has been reached. Indeed, a British C.I. engine—the Bristol "Phoenix"—holds the world's altitude record for this type of unit, so that it can be claimed that we have considerably exceeded the test-bench stage. For all that, it must be admitted that there is still insufficient experience available in all countries to make it possible to foresee with certainty how the Diesel aero engine will compare with the modern highly-developed petrol aero engine.

From the efficiency point of view, the Diesel engine should be superior to the petrol engine in fuel economy. Against that must be placed the fact that the Diesel is very much heavier than the petrol engine for every horse-power developed. While this difference in specific weight may conceivably be reduced, there is, unfortunately, no reason to believe that it can ever completely disappear. The pressure developed can be very high, and the bulk of material needed to withstand these pressures will, it must be supposed, always mean some increase in weight.

A few years ago the prospects seemed fairly bright. At that time the best petrol aero engines consumed something like 0.55 pounds of petrol per hour for each horse-power developed, while single-cylinder Diesel units were showing consumptions of about 0.4 lb. per h.p. per hour

or less. Then came the Air Ministry's decision to sanction the use of petrol fuels having a high octane number. This meant that compression ratios could be raised, and petrol engines benefited to the extent that specific fuel consumptions very nearly comparable with those of the earlier Diesels were attained. The result is that, taking into account the greater weight of the Diesel, this type of power plant cannot compete with the modern petrol engine using high octane fuels except over ranges of about 2,000 miles and upwards. As practically no aircraft attempt non-stop flights of such distances, it will be seen that the prospects are not bright from the efficiency point of view.

Then there is the question of reduced fire risk. On the face of it one would say—and many have said it and stated it in print—that because it uses heavy oil, the Diesel engine must be almost immune. That the risk is probably smaller than that associated with a petrol engine few will deny, but the so-called heavy oil used in Diesel aero engines is not actually so very "heavy," and it is possible that it may be ignited in a serious accident. Paraffin has an unpleasant habit of "creeping," and something of the same sort of thing may happen with the Diesel oil used. The absence of electrical ignition leads should, of course, be a great point in favour of the Diesel, which has other advantages besides.

Development Necessary

The modern petrol aero engine is the result of extensive (and expensive) research and development, and reliable petrol engines ranging from some 80 horse-power to about 1,000 horse-power are in existence. Obviously one cannot expect the Diesel type to attain such reliability until it also has undergone a comparable period of development and use. There is reason to expect that, at first at any rate, the comparatively smaller reliability of the Diesel type might lead to more frequent engine failures, and as fire is by no means the only risk in a forced landing, the overall safety might well be reduced, at least for a time.

We fully agree that the Diesel type of engine should be developed, but this must be done at the expense of the nation. It is far too great a task to be undertaken by private enterprise. In the meantime, more might be done immediately by concentrating attention on non-burstable petrol tanks and on the safest location of such tanks in the aircraft. The extra weight of such tanks would be negligible by comparison with the extra weight of a Diesel engine.

The Air Exercises

THE Air Exercises held every year by the R.A.F. Command, A.D.G.B., usually strike the citizens of London and the Home Counties as an unmitigated nuisance. They hate the noise of aero engines overhead, particularly at night, and complaints of broken sleep are usually numerous and loud.

Air Exercises are held as very necessary practice for all ranks of the R.A.F. People generally are more familiar with army matters than they are with those of the R.A.F., and they will, perhaps, appreciate that if generals and their staffs were placed in charge of large armies in war without ever having practised mov-

ing large forces about on manœuvres, they would certainly be quite at sea, would make bad mistakes from inexperience, would cause very high casualties, and would probably lose battles. The same applies to the R.A.F. The Commander-in-Chief has to command an organisation which may be described as heterogeneous. He has his squadrons, some of which are regular, while some are Special Reserve and Auxiliary. He has the Observer Corps, who are organised by the Air Ministry, but have special relations with the constabulary and the Post Office. Finally he has, or ought to have, the anti-aircraft gunners and engineers of the Territorial Army. This year only one searchlight battalion of the Territorial Army is able to take part, but a number of guns and searchlights of the regular army are sharing in the operations. Such a composite command could not possibly work smoothly without practice at least once a year. Everything depends on the prompt receipt of information about the approach of a raid, and the taking of proper steps to deal with it.

A staff officer of high rank at the Air Ministry recently expressed his belief that our air defence organisation was the best in the world. It would not long remain so if it were not regularly practised in Air Exercises.



SENIOR AND JUNIOR. Units of the Fleet Air Arm gave a wonderful exhibition of formation flying during their fly-past at the review by the King of his fleet. This is how the Blackburn "Baffins" of No. 810 (T.B.) Squadron appeared from one of the lower decks of H.M.S. *Glorious*. A sister-ship, the *Courageous*, is on the left of the picture. (Flight photograph.)

The Outlook

A Running Commentary on Air Topics

Unlucky

IN the absence of any information as to the cause—and it is unlikely that anything definite will ever be brought to light—there is little comment that one can make on last Sunday's K.L.M. Douglas crash in the Swiss Alps, when the thirteen occupants of the machine, including two well-known Englishmen, lost their lives.

That a thunderstorm of unusual severity was raging—unusual even for this district—there is little doubt, and it is probable that the navigator was unable to use his radio in order to obtain his position. The fact that the accident occurred on a plateau at a height of about 3,800 feet raises the question as to why the machine was not flying higher. The pilot may have been seeking an emergency landing ground, or the Douglas may have been brought down by lightning, though this is very unlikely. Another theory is that it was down several hundred feet by a violent gust. In such conditions, of course, the possibility of icing-up cannot be entirely ruled out, though this again is rather unlikely.

Whatever the reason, one must sympathise deeply with K.L.M., who seem to have been selected as a target for the slings of Fate in a most uncalled-for way. The wide diversity in the circumstances of the three-in-a-week accidents at least vindicates them of any charge of negligence in mechanical maintenance, and few question the ability of their pilots. The one less gloomy aspect of the whole business is the fact (reported in the Croydon news in this issue) that there has been practically no falling-off in passenger bookings.

A Black Week

RARELY if ever in the history of flying has there been such a run of bad luck as that which has pursued aviation during the last week or so. In seeking the causes, one is, as usual, faced with considerable uncertainty, several possible explanations suggesting themselves in connection with some of the mishaps, and conditions being such that the true reasons may never be known.

In the case of the Fokker crash and fire in Holland, it seems to be fairly well established that the engines on one side "cut" just after the take-off. A re-designing of the petrol supply system may possibly be necessary to ensure that such a thing can never happen again. Sluggishness in rising, followed by a subsequent stall, was apparently the cause of another passenger machine mishap, which was also followed by fire. The subject of fire prevention is dealt with in a leading article in this issue.

For the accident to the machine which fell into the sea off Cardiff last Monday there may have been various reasons. Witnesses stated that the machine was seen to "dive" into the shallow water, but whether this was due to stalling, or whether the pilot may have misjudged his height above the water and accidentally touched his wheels, is impossible to judge at present.

The accident to the Fairey "Fantomé" in Belgium is also somewhat inexplicable. It appears that Mr. Trower had been giving a demonstration of aerobatics, and that in coming down afterwards the machine descended at an angle of approximately 45 degrees without flattening out. Modern high-speed aeroplanes can impose very serious loads on the pilot, and it is by no means certain that in this case the pilot did not faint.

It can only be hoped that the law of averages will now adjust matters in such a way that we have a long accident-free period ahead.

A Flying Boat Effort

CONSIDERABLE interest attaches to the flight, which started early last Tuesday morning, of a "Singapore III" under the command of Sqn. Ldr. Plenderleith from Mount Batten to Singapore. The boat, of course, is intended to replace the one which crashed in Sicily when four flying boats of this type were being sent out to re-equip No. 205 F.B. Squadron. The Air Ministry is taking the opportunity to test the endurance capacity of this type of aircraft by laying down a schedule of stops at British ports only. For years past the ambition of the Air Ministry has been that our flying-boat squadrons should be able to reach Gibraltar, a distance of 1,070 miles, without refuelling, with full service load, and then make another non-stop flight to Malta, a further distance of 985 miles. A thousand miles non-stop does not seem to be a very ambitious goal for an Air Force boat to set before itself in the year 1935. The Sikorsky S-42, for example, can carry a pay-load of 1,500 lb. for 3,000 miles, and for a flight of one thousand miles it can carry 8,363 lb. and can cruise at 157 m.p.h., which is nearly 50 m.p.h. faster than the "Singapore."

Future British Flying Boats

THE Sikorsky S-42 and the "Singapore III" are craft of very different classes, and comparisons between a commercial and a Service aircraft are apt to be misleading. The Royal Air Force needs boats able to stand up to rougher conditions than the boats of Pan-American Airways are thought likely to have to endure, and that accounts for some of the difference, which at first sight seems so startling.

A few years ago we led the world in this class of aeronautical progress, but while we in Britain have been marking time and economising, the Americans, including their brilliant Russian immigrant, have been pushing ahead. However, new British flying boats are now on the stocks which will, it is hoped, show a vastly improved performance, and compete on all counts with foreign-built boats.

Running Up

SINCE the present-day aero engine is so very reliable one cannot help wondering whether a number of pilots are not taking it too much for granted. A comparative spate of accidents resulting from engine failure immediately after the take-off suggests that the preliminary running up may not have been conscientiously carried out in every case.

A prolonged burst of one-third throttle followed by a full-throttle test should reveal even a fault in the fuel system and at no time is engine failure so markedly serious as it is when the machine has only just left the ground. Pilots of single-engined machines must find a soft spot immediately and pilots of multi-engined machines may not be able to correct the violent swing against the dead engine or engines. To throttle an engine back deliberately at a safe height is one thing; to have an engine cut on one within a few feet of the ground is quite another.

Time after time one sees pilots taking off with or running up almost cool engines. This appears to be positively asking for trouble, or at least for heavy replacement bills in due course.



A Modern Carpetbagger—Part IV

Loading up an American Airlines Curtiss "Condor" sleeper-plane at Los Angeles preparatory to starting a transcontinental flight. The berths are larger and more comfortable than those on railways

THE LAST LAP

*Mexico to New York : The Finish of a "Flight" Representative's Hustle
Around the United States by Air*

By C. N. COLSON

IN my last instalment I got to Mexico City, which is the centre of much Pan American activity. Their lines run to Brownsville, Merida (in Yucatan), and come from the south; and Aerovias Centrales, a subsidiary, runs to El Paso and Los Angeles.

The aerodrome is large, but the station buildings are a little too Mexican—so they are falling down at present! The new ones, when built, will be very grand indeed; at least, that is what they told me, but actually I may not have heard all about it, because at this stage it was arranged that I should have a day's tarpon fishing at Tampico on the morrow—and the anticipation of that didn't leave much room for thinking about aviation.

I wish I had the space to tell you all about the intriguing city of Mexico, but I mustn't steal the thunder of the travel magazines, nor spoil your pleasure by telling you what you will find when you read your Mexican histories—as I hope you will now do; believe me, you are missing a great deal if you delay any longer learning how that vast country came into being.

So far I have said very little in this series about times, average speeds, and so on. This was not because they were not good enough to bear mention—they were, but over a great deal of my journey it would have been unfair to the various companies to have dilated at any length on the speeds made good, because the schedules are frankly experimental. In many cases the published schedules are those

for older machines, and the superior speed of the new equipment is only at present being made use of in order to see how much time can profitably be saved. However, on this last leg it is instructive to go into the subject. People in Europe seem rather definitely divided into two schools: those who unequivocally denounce the published speeds of American aircraft as pure bunkum and those who take the advertised figures as gospel. Actually, of course, the facts lie somewhere between the two. One fact stands out clearly after very little experience of air travel in the U.S.A., and that is that overall route speeds of more than 150 m.p.h. are quite common.

This last lap was made without stop from Tampico to New York, flying night and day in a variety of aircraft; aeronautically, it is therefore an excellent one to take for the question of average speeds.

The air traveller from Mexico to New York does not usually delay his journey at Tampico. There are only two reasons for stopping there at all—oil and tarpon; the latter was my excuse. Mr. W. L. Morrison, Central American Pan American manager, never needs to think twice if he can get an excuse to go after these peers of fighting fish, and I was more than willing to be that excuse. So we "stayed over" one scheduled machine in that God-forsaken relic of a past oil boom called Tampico. After waiting all my life for the chance to get into "seven foot of tarpon," I could hardly believe I really at last had a rod

Looking down on a Douglas : This machine, perhaps more than any other, has given the American flying passenger a new conception of air travel

in my hand; my thumb achingly tensed on the brake, and the thought constantly running through my head that, whatever happened, I was darned if I would give up the fight and hand my rod to someone else once I was well into a fish. However, as usual, my fishing luck was out. The river almost boiled with leaping tarpon, but they didn't seem attracted by our spoons at all; so we consoled ourselves with some large roballo caught soon after dawn the next morning before leaving in the Pan American Ford for Brownsville.

Thank goodness those Fords are soon being retired. The man who arranged the seating in them ought to be made to sit in them six days a week. The route was uninteresting—mostly over the sea or the edge of the coast, and there was nothing to do except wonder where on earth to put one's legs; my knees still have bruises on them from that journey! However, it ended at last, and the speed worked out at 110 m.p.h.

Brownsville is the repair and maintenance base for the Central American Division of Pan American Airways. Clean, beautifully kept shops house all the machines and engines as they come in for overhaul, and, despite the amount of work which is done, the floors and benches look fit to have one's meals off. The general system is much the same as at Miami, and the routine work, of necessity, follows the same general plan. Of course, a large number of land machines is dealt with at Brownsville, and these call for slightly different treatment, but, whether with land machines or flying boats, the constant-maintenance system is adhered to.

Here, incidentally, I saw a Fairchild cabin monoplane, with dual controls in the rear cockpit and a very complete instrument layout. The windows of the cabin were opaque,



so that the machine could be used for blind-flying training.

I left Pan American at Brownsville and took the Bowen Air Lines Vultee to Fort Worth in Texas. I have already said a good deal about this wonderfully efficient machine, and the route, lying as it does over flat country, is one of those on which single-engined aircraft are permitted. Our journey of 567 miles, with three intermediate stops, was made at an average of 189 m.p.h. We were a bit late in starting, and no doubt the pilot was pushing along somewhat faster than usual, but certainly not so that a passenger could notice it; nor was there any appreciable tailwind. The country, being flat, was agricultural, devoid of prominent landmarks and comparatively uninteresting.

Fort Worth to Cleveland I made in my old friend the American Air Lines sleeper-plane, the Curtiss "Condor." With seven intermediate stops the 1,145 miles were covered at 126 m.p.h.—not a bad bit of ground to cover in the course of a comfortable night's sleep. I slept like a log, so I can't tell you what the country was like.

Cleveland to New York (Newark Airport) was my only experience of the United Air Lines Boeings. They are certainly fast, as we did the 405 miles to Newark at 162 m.p.h., but I hope that someone will soon kill the fashion for low-wing monoplanes. They are hopeless if you are at all interested in seeing the scenery, and even the rear seats of the Boeing are forward of the trailing edge of the wing. By peering out behind my seat I did manage to see the much-discussed, weird formation of the Allegheny mountains. These look like double ridges left on the sea shore by giant waves.

United Air Lines dress their stewardesses in green to match the upholstery of the machines; an excellent plan and very restful to the eyes—both the stewardesses and the upholstery, I mean.

To sum up a journey of this nature would take a book, but if one thing stood out more clearly than another it was the vast difference in outlook between the U.S. domestic air lines and Pan American airways. The former put speed above all. They advertise speed. They think speed. They sell speed, and cut each other's throats over speed. If

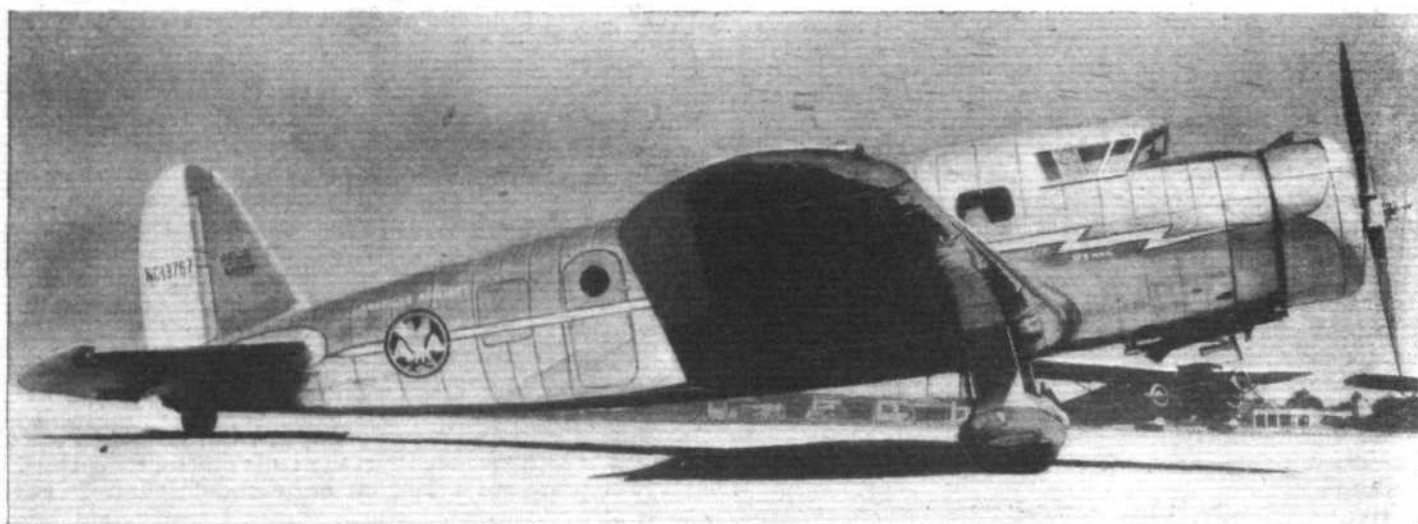


Mexico City Airport from the air. The large main building is now being rebuilt—as Mexican buildings have not the lasting quality of those erected by their Aztec ancestors

The 15,677-mile route covered by the author. In this article he describes the final stage from Mexico City to New York

Brown's Super Air Line runs across the Continent in ten hours, then Smith's Hyper Airway must do it in nine and a half. Of course, the problems of the domestic and foreign lines are totally different, but it did seem to me that the former would do well to remember that they are running transport services for the benefit of traffic in mails, freight and passengers, and that they are not just companies whose main business is to run aeroplanes from A to B in the shortest possible space of time.

There is a great deal of talk of running larger aeroplanes. My impression was that doing so would only get them into even greater difficulties than they are in at present, whereas more frequent services and less competition (within reason) would solve many of their problems. However, I shall have more to say on subjects like these at a later date.



A Vultee of American Airlines. The same type is also used by Bowen Air Lines from Brownsville to Fort Worth. This machine is probably the fastest on any scheduled air line in the world

OBITUARY

FLIGHT regrets to have to place on record the deaths of the following:

Lady Sempill, who died on Thursday, July 18, was the only daughter of Sir John Lavery, R.A., by his first marriage to Kathleen, daughter of Mr. James McDermott. Lady Sempill married Lord Sempill, then the Master of Sempill, in February, 1919, and has been a constant and enthusiastic supporter of all matters connected with private flying and flying clubs. She often accompanied her husband on air tours in his machine. Lady Sempill has also been closely identified with the various women's organisations which have formed aviation sections. She leaves two daughters, the Hon. Moira Forbes-Sempill, aged 15, and the Hon. Mary Forbes-Sempill, aged 13.

Her death will be a great loss to the growing number of women who either take the keenest interest in flying or who are making it their career.

Lieutenant S. H. G. Trower, who had been a test pilot of the Fairey Aviation Company since 1932, was killed when the "Fantome" single-seater fighter, built by that company for a Belgian competition, crashed at Evere on Wednesday of last week.

Entering the Navy in 1917, Lt. Trower retired from that

service in 1920, and two years later was granted a short-service commission in the R.A.F. In 1926 he was transferred to the Reserve. Subsequently he flew for the Air Survey Company in the Federated States, Burma and India. Lt. Trower, who was 35, leaves a widow.

Mr. Richard Langley, brother of Mr. Marcus Langley, died last Tuesday. He was well known to the model-flying fraternity, having been intimately associated with the S.M.A.E. for many years.

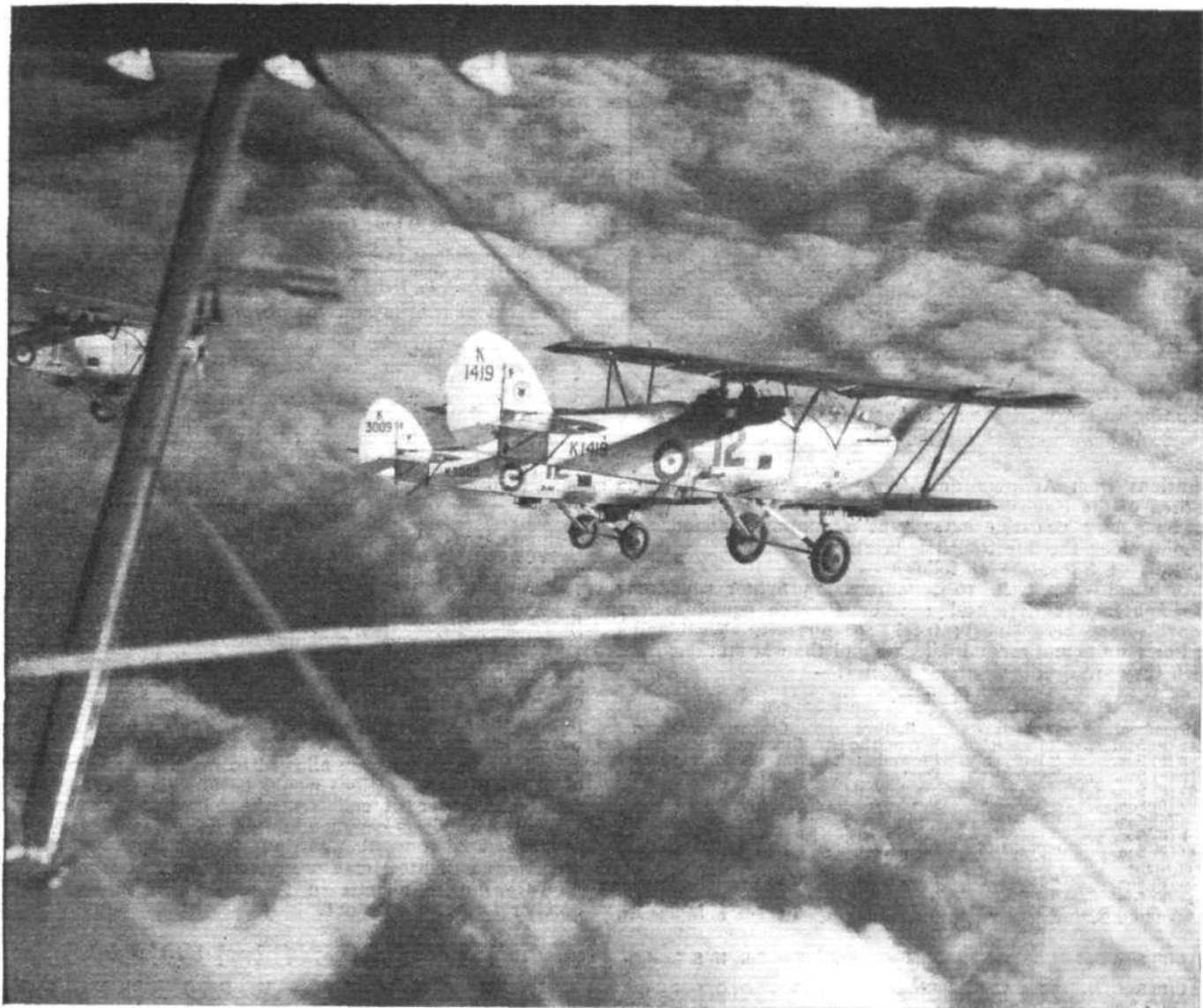
Marconi Service

THE rapid expansion of air services from England to the Continent of Europe, as well as within Great Britain, has occasioned a corresponding increase in the activities of the Marconi Aircraft Service Department, in view of the large number of commercial machines fitted with Marconi wireless apparatus.

The main service depot is located at Croydon Aerodrome, where Air-Ministry-approved shops and stores, containing complete spare aircraft installations, as well as accessories, are available, so that repairs and replacements can be effected expeditiously.

THE AIR EXERCISES

This Week's London Defence Tactics Discussed : A Flight in a Raiding Machine



A fine impression of No. 12 Squadron's Hawker "Harts" about to dive through a gap in the clouds shortly before making an attack on London

THE annual air exercises in connection with the Air Defence of Great Britain are taking place this week. They began at 6 p.m. last Monday and are due to conclude at 8 a.m. to-morrow. They are under the general direction of Air Chief Marshal Sir Robert Brooke-Popham, G.C.V.O., K.C.B., C.M.G., D.S.O., A.F.C., A.D.C., Air Officer Commanding-in-Chief, Air Defence of Great Britain. Operations are being carried out in two phases, as follows:—Phase 1: Between 6 p.m., July 22, and 8 a.m., July 23, a fourteen-hour continuous period. Phase 2: Between 6 p.m., July 23, and 8 a.m., July 26. In this phase the exercises are being carried out for one continuous period not exceeding forty-eight hours.

The total number of aircraft taking part is approximately 370.

In order to make the exercises interesting they are again centred round a general idea. The scheme envisages an imaginary situation in which all the forces on the one side are bomber units, and on the other fighter units, supplemented by some reconnaissance aircraft and ground defences consisting of searchlight units and the Observer Corps.

This situation is, of course, entirely unreal, as the bomber units are an essential part of the air defence of this country. Their action must not be regarded in any way as a reprisal; they would be carrying out a definite military operation with a definite military object, namely, to force the enemy air force on the defensive. They would fulfil this role partly by attacking enemy aerodromes, aircraft depots and aircraft fac-

ories, and partly by attacking other targets of a military nature of vital importance to the enemy. This action will not merely reduce the strength and efficiency of the enemy air force but, if effectively carried out will force the enemy to concentrate upon defending himself rather than upon attacking us.

"Northland" is a country acting on the defensive, whose air forces consist of fighter units only and a certain number of reconnaissance aeroplanes. These are under the command of Air Vice-Marshal P. B. Joubert de la Ferté, C.M.G., D.S.O., Air Officer Commanding Fighting Area. His headquarters are at Uxbridge.

Northland's territory consists of England as it is to-day, but operations are confined to the area south and east of a line joining King's Lynn, Banbury and St. Albans Head. The capital is Halton, but the main attacks were expected, when the exercises began, to be delivered against London, where Northland's most important aircraft factories, services, depots and administrative war organisation are situated.

"Southland," the attacking country, possesses an Air Force comprised entirely of light, medium and heavy bomber squadrons, and is under the command of Air Vice-Marshal P. H. L. Playfair, C.B., C.V.O., M.C., Air Officer Commanding, Western Area, and Air Commodore H. R. Nicholl, C.B.E., Air Officer Commanding, Central Area, each controlling and operating the squadrons forming part of their respective areas. These two officers are acting in collaboration and will respectively control



A.V.M. H. L. Playfair, a "Southland" Commander, pointing to the map, with Air Cdre. J. C. Quinell, Wing-Cdr. R. Goddard and Sqd. Ldr. F. B. Harris.

operations from Andover and Abingdon. Southland covers the area of the English Channel and the Southern North Sea. Her imaginary coastline extends at a minimum distance of 30 miles along the line from the Wash to Portland.

Details of forces are as follows:—

Northland.—Strength, 16 squadrons, 15 fighter squadrons (180 fighter aircraft), and 1 reconnaissance squadron (12 reconnaissance aeroplanes); total, 192 aircraft. Northland's Air Force units and ground defences and the war stations from which they are operating are as follows:—

Fighters.

Squadron.	Type of Aircraft.	Station.	Commanding Officer.
No. 41 (F) Sqn. ...	"Demon" ...	Wyton (Hunts)	Sqn. Ldr. J. A. Boret.
No. 3 (F) Sqn. ...	"Bulldog" ...	Duxford	Sqn. Ldr. G. Martyn.
No. 19 (F) Sqn. ...	"Gauntlet" ...	Duxford	Sqn. Ldr. J. R. Cassidy.
No. 25 (F) Sqn. ...	"Fury" ...	North Weald	Sqn. Ldr. W. F. Dickson.
No. 29 (F) Sqn. ...	"Demon" ...	North Weald	Sqn. Ldr. C. Chapman.
No. 56 (F) Sqn. ...	"Bulldog" ...	North Weald	Flt. Lt. J. W. Colquhoun.
No. 1 (F) Sqn. ...	"Fury" ...	Hornchurch	Sqn. Ldr. C. W. Hill.
No. 43 (F) Sqn. ...	"Fury" ...	Hornchurch	Flt. Lt. W. K. Beisiegel.
(2 flights).			
No. 65 (F) Sqn. ...	"Demon" ...	Hornchurch	Wing Cdr. F. O. Soden.
No. 23 (F) Sqn. ...	"Demon" ...	Biggin Hill	Sqn. Ldr. H. G. Crowe.
No. 802 (F.F.) Sqn. ...	"Nimrod" ...	Biggin Hill	Sqn. Ldr. R. H. Hanmer.
and "Osprey."			
No. 17 (F) Sqn. ...	"Bulldog" ...	Kenley	Sqn. Ldr. H. S. Broughall.
No. 54 (F) Sqn. ...	"Bulldog" ...	Kenley	Sqn. Ldr. G. D. Daly.
No. 111 (F) Sqn. ...	"Bulldog" ...	Northolt	Sqn. Ldr. E. P. Mackay.
No. 43 (F) Sqn. ...	"Fury" ...	Tangmere	Sqn. Ldr. A. M. Wray.
(1 flight).			
No. 601 (F) Sqn. ...	"Hart" ...	Tangmere	Sqn. Ldr. R. G. Shaw.

Reconnaissance Aircraft.

Squadron.	Type of Aircraft.	Station.	Commanding Officer.
No. 2 (A.C. Sqn.) ...	"Audax" ...	Manston	Sqn. Ldr. J. H. Green.

Ground Defences.

(a) Commander Air Defence Formations, T.A. Ma. Gen. R. H. D. Tompson, C.M.G., D.S.O. Unit.	Location.
26th A.A. Searchlight Batta., R.E. (T).	Manston.
(b) Commander, 1st Air Defence Brigade, Colonel A. A. S. Younger, D.S.O. Unit.	
1st A.A. Brigade, R.A. ...	Tilbury Area.
2nd A.A. Brigade, R.A. ...	
1st A.A. Searchlight Batta., R.E. ...	

An observation system has been organised covering the whole area of operations. It consists primarily of the Observer Corps and, in some districts, the sound locator posts of the searchlight units, supplemented by reports from reconnaissance aircraft.

Bombers fire smoke puffs to simulate the bursting of anti-aircraft shells.

Southland's air forces are: Strength, 16 squadrons; 7 light bomber squadrons (84 aircraft), 8 heavy bomber squadrons (80 aircraft), and 1 medium bomber squadron (12 aircraft); total, 176 aircraft. Southland's air units and their war stations are as follows:—

WESTERN AREA. Light Bombers.

Squadron.	Type of Aircraft.	Station.	Commanding Officer.
No. 12 (B) Sqn. ...	"Hart" ...	Andover	Sqn. Ldr. A. C. Bayley.
No. 142 (B) Sqn. ...	"Hart" ...	Andover	Sqn. Ldr. A. O. Lewis-Roberts.

Heavy Bombers.

No. 7 (B) Sqn. ...	"Heyford" ...	Worthy Down	Wing Cdr. A. Gray.
No. 58 (B) Sqn. ...	"Virginia" ...	Worthy Down	Sqn. Ldr. O. R. Gayford.
No. 9 (B) Sqn. ...	"Virginia" ...	Boscombe Down	Wing Cdr. G. H. Cock.
No. 10 (B) Sqn. ...	"Heyford" ...	Boscombe Down	Wing Cdr. M. B. Frew.
No. 99 (B) Sqn. ...	"Heyford" ...	Mildenhall	Sqn. Ldr. H. V. Drew.
No. 500 (B) Sqn. ...	"Virginia" ...	Manston	Sqn. Ldr. G. M. Lawson.
No. 502 (B) Sqn. ...	"Virginia" ...	Manston	Wing Cdr. J. C. Russell.
No. 503 (B) Sqn. ...	"Hinaidi" ...	Hawkinge	Wing Cdr. A. P. V. Dale.

CENTRAL AREA.

Light Bombers.

No. 35 (B) Sqn. ...	"Gordon" ...	Bircham New-ton.	Sqn. Ldr. V. Buxton.
No. 207 (B) Sqn. ...	"Gordon" ...	Bircham New-ton.	Sqn. Ldr. R. J. Rodwell.
*No. 15 (B) Sqn. ...	"Hart" ...	Abingdon	Wing Cdr. T. W. Elm-hurst.
*No. 40 (B) Sqn. ...	"Gordon" ...	Abingdon	Flt. Lt. C. N. H. Bilney.
*No. 33 (B) Sqn. ...	"Hart" ...	Upper Heyford	Sqn. Ldr. J. W. Baker.

Medium Bombers.

No. 101 (B) Sqn. ...	"Sidestrand" ...	Bicester and "Over-strand."	Sqn. Ldr. E. B. C. Betts.
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* These squadrons, from time to time during the Exercises, at the discretion of the Air Officer Commanding, Central Area, operate from advanced refuelling grounds at Mousehold, Martlesham and Manston.

The list of targets and the objectives which they represent are:—

Target.	Objective Represented.
1. HALTON	Capital of Northland.
2. CARDINGTON	Military Depot for Army Reservists.
3. SOLVENT PRODUCTS, LTD.	Centre of Motor Car Industry.
DAGENHAM.	
4. R.A.F. STATION, HENDON	Important Northland aerodrome.
5. NEW FACTORY, PARK ROYAL	Important aircraft factory.
6. WIMBLEDON, ALL ENGLAND	Main supply depot for aircraft and engines.
7. LAWN TENNIS CLUB GROUNDS	Northland's Air Ministry.
8. AIR MINISTRY	An important Naval Dockyard.
9. TILBURY DOCKS	
10. R.A.F. STATION, NORTHOLT	Important Northland aerodromes.
11. R.A.F. STATION, DUXFORD	
12. R.A.F. STATION, NORTH WEALD	

It may be a matter of surprise to those observing the air exercises to see a complete squadron of "enemy bombers" flying in an intact formation over London after having been "intercepted" and "roughly handled" by the defending fighters. In peace exercises it is difficult to assess casualties efficiently or to reproduce in bomber or fighter formations their cumulative effect. It is for these reasons that squadrons pursue their course apparently unaffected by any action taken by the other side.

Bomber formations are allowed to make use of clouds, since otherwise their operations would be unrealistic, but, to minimise the danger of collision, the following precautions are taken:—Air officers commanding Southland arrange their raids so as to avoid congestion en route to and from, and over, the objectives. Fighters may ascend and descend through clouds but are not to operate in them, whether in contact with bomber formations or not.

THE DEFENCE PROBLEM

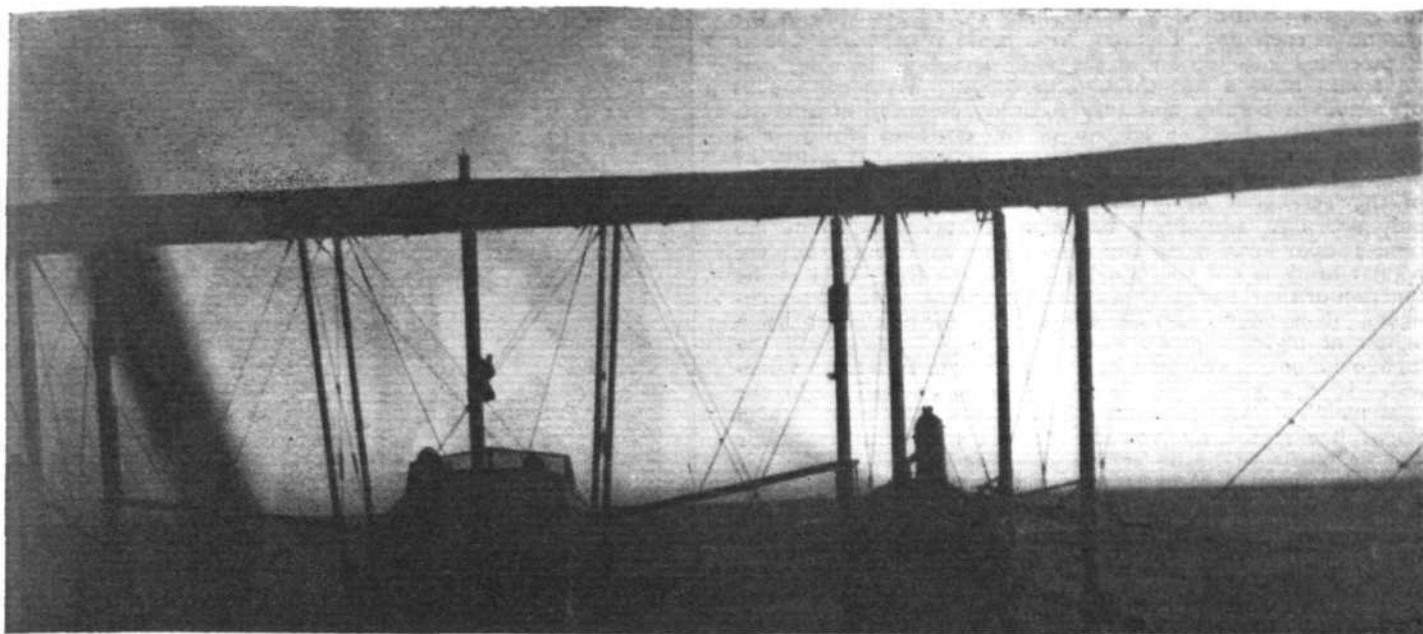
By MAJOR F. A. de V. ROBERTSON, V.D.

London, Monday, July 22.

THE exercises began at 6 p.m. on Monday, but before zero hour everyone concerned was very busy with preparations. Several novelties of importance are being tried out this year, and in order to study the subject I paid visits to the H.Q. of the Fighting Area at Uxbridge and of the Western Area at Andover. The visits proved extraordinarily interesting.



A.V.M. P. B. Joubert de la Ferté, "Northland" Commander (centre), with Air Cdre. E. A. Masterman, O.C. the Observer Corps, and Air Cdre. O. T. Boyd.



Flying Londonward in the twilight.—A *Flight* photographer's impression from the tail cockpit of a "Virginia" of No. 502 B. Squadron.

Though it is the official doctrine that our bombers will play the most important part in the scheme of air defence, in these Exercises their plan of campaign has to be subordinated in some ways to giving practice to the various elements of the defence. There are only a few searchlights at work this year, and the districts where they work must not be avoided, but must be given practice, and the Observer Corps, when on duty, must also be given every opportunity to spot raiders and send in reports. Some of the bomber squadrons have been given advanced landing grounds this year. This is a novelty, but is of no tactical importance and does not really affect the raid routes which have been given them, as all Southland aerodromes and landing grounds have to be in Northland territory, and raids only start when the bombers have flown out to sea and then come in over the coast. The advanced landing grounds are for practice in refuelling and suchlike organisation. Another novelty this year is taking off before dawn and landing after dark by the two "Gordon" squadrons at Bircham Newton, Nos. 35 and 207 B.S., and this again is not of much tactical importance. When the Observer Corps are on duty, the staffs of the bombers are at liberty to try to confuse the defence by feinting at one target, and then changing direction and attacking another; but when the Observers are not at work the operations become more unreal. The bombers must report by wireless when they come in over the coast, and then must keep to their allotted course, while the umpire staff works out where they ought to be at each moment thereafter, and the defence takes action accordingly. These plans may be upset by a strong wind either against or behind the bombers, and energy may be wasted accordingly.

Bomber Casualties

The defence problem may be stated briefly thus: The object is to inflict as many casualties as possible on the raiders. If the casualty rate can be made high enough, it is held (and experience in 1918 goes to confirm it) that the raiding will stop. Of course, to produce this result the defence proper and the counter-attack must work together, but for the moment we are considering the defence by itself. The probable rate of bomber casualties might be worked out (at least by day) by using camera guns in exercises over a number of years, but this has not yet been done. But if a bomber squadron is scheduled to make four raids a week, and if it loses one machine on each raid, a simple sum shows that in a fortnight the casualty rate of a nine-machine squadron will be just on one hundred per cent. It must be admitted that a bomber casualty inflicted on the return journey is as valuable in putting a stop to raiding as one inflicted before the raiders have reached their target. The people who have suffered from the bombs may not realise that fact, but to the raiders a casualty is a casualty, and its effect on their strength and their spirits is the same whether the bombs have been dropped previously or not.

The great problem of the fighters is to make contact with

the raiders. The Observer Corps is very good, and its reports come in very promptly and very accurately. The same may be said of the Territorial units, though their instruments come into action later and so give less time to the H.Q. of Fighting Area to take action on their reports. Lately the pace of bombers, and particularly light bombers, has increased to such an extent that it has forced the Fighting Area to adopt novel tactics. The Thames mouth offers the most difficult problem, as fast bombers could be into London in eight minutes after being reported. The approach from the south, too, is also unpleasantly fast. Therefore, this year for the first time, the plan of standing patrols of fighters by day has been adopted. Hitherto the rule has been that by night single fighters went up on standing patrol, and relied on the searchlights to show them the bombers, but by day all the fighter squadrons remained on the ground until the receipt of orders from Fighting Area, when they took off and climbed as fast as they could to the level at which the raid was expected. Now, owing to the speed of the light bombers, it is not safe to waste time in taking off and climbing, at least on the east and south of London, and therefore the plan of standing patrols by day has been adopted. With patrols in the air eight minutes allows sufficient time for the fighters, working on the inside line, to take action.

The system of standing patrols by day has been adopted with reluctance, as it is considered an extravagant use of aircraft. Fighting Area likes to keep a good reserve on the ground to cope with emergencies. Therefore the standing patrols will consist of the smallest number which will make useful tactical units. With engines well throttled down to cruising speed, both "Furies" and "Demons" can stay in the air for three hours. When in the air they get their orders from Fighting Area by radio telephony, as information of raids is received from the Observers and the Territorials. A great deal of responsibility rests on the leader of the fighter formation. H.Q. can only tell him where to look for the raid, and its estimated height. The fighter leader, when he reaches that height, must decide for himself whether the information given him as to the enemy's height is likely to be accurate. He will judge from the clouds and the weather generally if the enemy is likely to be flying higher or lower than was estimated. When he sights the enemy he will note their numbers and other facts about them, and will decide what form of attack he will use, and will give his orders to his pilots by radio telephony. Once contact has been established, the matter is altogether out of the hands of the ground command, and the fighter leader does what he thinks best. Naturally a very great deal depends on good leading, and if ever war breaks out again we must hope that many leaders like Mannoock and McCudden will be found. Finally, everything depends on the marksmanship of the individual pilots, and marksmanship is now practised on a system which was not known in 1918.

The continuous operations for forty-eight hours were calculated to put the staffs of both sides to a useful test. From

the defence point of view, when there was an armistice in the middle of each day, Fighting Area could cram every fighter it possessed into the air in the early morning, knowing that all would have a rest through the day. With continuous operations it became necessary to study economy of aircraft.

The most deplorable feature of the exercises this year is the very small number of searchlights at work. It is for the War Office, not the Air Ministry, to decide when the units of the Territorial Army shall go into camp, and this year only one T.A. searchlight battalion is at work. There are some regular army guns and searchlights at Tilbury, but the regular army is not concerned with air defence. That is the function of the Territorial anti-aircraft units. Without searchlights, it is admitted that interception of a bomber by a fighter at night is practically impossible. Therefore all the night raiding this year will be so unreal as to be almost valueless. It is unfair to our heavy bombers, as well as to our fighters. This is one more illustration of the need, which *Flight* has repeatedly voiced, that all the elements of air defence ought to be under the complete control of the Air Ministry. Dual control is dangerous and may bring about disaster.

WITH THE ATTACKERS

By Lieut. Comdr. C. N. COLSON

IN nine cases out of ten night is the best and most pleasant time to fly. Given reasonably good visibility, so that the lights of towns can be seen, a flight in such circumstances is smooth and full of interest. There are seldom any bumps to throw the machine about, and, contrary to general opinion among those who have yet to experience the joys of night flying, a very great deal can be seen.

Last Monday night I took part in the "war." I drove down to Manston, near Ramsgate, where I was to form part of the crew of a Vickers "Virginia" later that evening. The first thing to strike me was the lack of hurry or excitement. The night bombers ("Hinaidis") of No. 503 (County of Lincoln) Squadron, and those "Virginias" of No. 502 (Ulster) Squadron, with whom I was to fly, were all being fuelled and prepared for their aggressive work. Other squadrons of light bombers and reconnaissance machines were setting out on, or returning from, raids; everything looked war-like but ordered.

Passengers like myself are always accommodated in the tail-gunner's cockpits on such occasions as these. The uninitiated think "Poor mutt!" As a matter of fact they need not waste their sympathy—that cockpit is a jolly good position to occupy. It is really nothing like as draughty as may be thought. The outlook is excellent all round, and, after all, if by some chance a forced landing has to be made and the front of the machine runs into a wall, there is a great deal of machine which has to be concentrated before the man in that tail-gunner's cockpit gets squashed. It is quite amusing to sit there while the whole of the front part of the machine appears to pivot about the tail; one can't help thinking "What on earth is the pilot doing? Does he think he is throwing me about?"

After I had been "shoe-horned" into (1) a Sidcot suit—I was already wearing the extra clothing advocated by the Air Ministry Press Department—(2) helmet and goggles—latter unnecessary in that cockpit—(3) an inflatable lifebelt, (4) parachute harness, I was hoisted over the gun ring and left to bark my own shins on all the clips for cartridge drums and so on. Taking off—hanging on like grim death to prevent myself being bumped out as the tail bounced—we climbed up, through a light mist, out of the earthly twilight into a glorious clear sunset. First we made a feint up the coast towards Chatham and then turned south-east to Dover. Climbing steadily, we were well above the cloud layer by the



A sound-location post of the 25th (London) A.A. Searchlight Battalion at Manston, the only Territorial unit taking part in these Exercises.

time Dover Castle, the harbour, and the lights of the Lord Warden (sometimes called the "honeymooners' rest") appeared below.

As we were part of the "enemy" our serious job of work didn't really start until we came over the coast from the sea, so out we went, and came in again somewhere about Broadstairs or Ramsgate. Lights were now showing up everywhere—advertisement signs, illuminated buildings, roads and motor cars. We could see them all through the gaps in the clouds. However, these latter were rapidly getting thicker, and soon we were flying in a world of our own, over a solid sea of undulating cotton wool whose wave tops were tipped with pink by the setting sun; this sort of thing makes you feel ten years younger and wonder why anyone travels by any means except the air. Our course lay over the mouths of the Swale and Medway, across the Thames, near Tilbury, to Park Royal, our objective, which was destined to be well and truly "bombed."

We dived below, from our clear and sunset-lit vault, through a wet and chilly blanket into the earth-bound night somewhere over the Isle of Sheppey, and near Tilbury we got our first thrill. A ring of searchlights were focused on a formation of three "Heyfords." They didn't see us, as we doused our navigation lights and dived between the beams—they were too occupied with the "Heyfords."

On our way back from the target another formation whistled below us, and twice we saw lone raiders, presumably from our own squadron.

Our journey home was uneventful; there was leisure in which to look at the various towns and follow the rivers and bends in the coast, as we felt that our job was nearly done and that we had been successful where others had failed. Finally, Manston aerodrome appeared again, and, landing down the flare path, we rumbled to a stop. We had been over London and back and now we had to return to it at thirty miles an hour in a worn-out motor car—what a comedown!

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in the list.

July 26. Opening of Newcastle-upon-Tyne Municipal Airport.

July 27. London-Newcastle Race, Newcastle Aero Club.

July 27. Hanworth Club's Garden Party at Aldenham.

July 28. Private Owners' Garden Party, Ratcliffe, Leicester.

July 28. Garden Party at Yeadon, Yorkshire Aeroplane Club.

July 31. Inter-Services Athletics Championships, Uxbridge.

Aug. 10-20. Second International Austrian Alpine Flight.

Aug. 17. Round the Isle of Wight Air Race and Portsmouth Air Trophy.

Aug. 24-25. Third International Flying Meeting, Lympne.

Aug. 24-Sept. 1. National Gliding Competition, Sutton Bank.

Aug. 24-25. Cinque Ports Club. International Flying Meeting and Wakefield Cup Race.

Aug. 24-30. Raduno del Littorio, Rome. Reale Aero Club d'Italia.

Sept. 6-7. King's Cup Air Race.

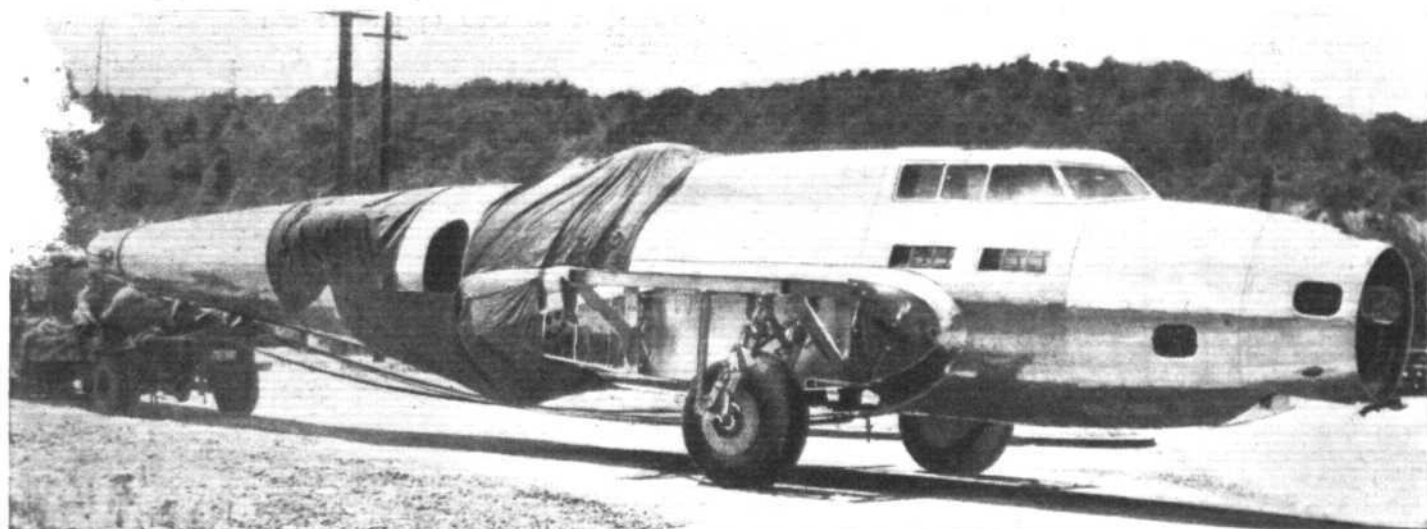
Sept. 14. Cinque Ports Club. Folkestone Aero Trophy Race.

Sept. 15. Gordon Bennett Balloon Race, Warsaw.

Oct. 12-28. International Aircraft Exhibition, Milan.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



ON THE ROAD : The fuselage of a new and experimental Boeing bomber which has been entered in competition with other types at Dayton, Ohio. It will be known as the Boeing 299. Four "Hornet" engines, driving constant speed airscrews, are fitted. The span is approximately 100ft. and the gross weight about fifteen tons. A speed between 200 and 250 m.p.h. at 10,000ft. is demanded by the specification.

Thirteen Engineless Hours

Mr. J. C. Neilan has claimed the British gliding duration record with a stay in the air of 13hr. 7min.

Persuasive Measures

The military committee of the American House of Representatives has launched a campaign to persuade Congress to allot over eight million pounds for the construction of additional aircraft.

Inter-Continental

A single engined Russian aeroplane with a crew of three is to attempt a non-stop flight from Moscow across the Arctic to North America and then, via Banks Island and Vancouver, to San Francisco. The Soviet Government has requested British permission to fly over Canadian territory.

He Jumped to It

"Get ready to jump," shouted the pilot of a U.S. National Guard aeroplane to his passenger, Maj.-Gen. George Leach, when the machine caught fire over the Arizona desert. The General heard only the word "jump" and promptly obeyed, while the pilot flew on for ten miles before he went over the side. After a long tramp through the desert the General reached a ranch, while airmen and cowboys sought him in vain. The pilot had only a comparatively short walk to civilisation.

An Italian Achievement

A new world's non-stop flight record for seaplanes is claimed for an Italian Cant. 501 monoplane fitted with a 750 h.p. Isotta Fraschini engine. The flight, from Montfalcone, near Trieste, to Berbera in British Somaliland, a distance of 3,104 miles, was made in 24hr. 55min.

Dancing With Tears in His Eyes?

Major Charles G. Percy left the base of the U.S. Army Air Corps at Shreveport, Louisiana, at 4.15 one morning in a Boeing P-26A fighter. By 4 p.m. he was in Seattle—2,200 miles away—leaving ample time to dress for a dance which he attended that evening.



SYMBOLICAL. Members of the Soviet Aero-hydrodynamical institute who took part in a recent sportsmen's parade in Moscow carried giant models of the machines which are to replace the *Maxim Gorki*.

London Looks Ahead

A proposed five-year plan to modernise the Royal Victoria Dock makes provision for seaplanes.

A Colourful "Comet"

Mr. T. A. Campbell Black's new and improved D.H. "Comet" has made its first flight. It will be finished in peacock blue, ultramarine blue and silver.

Brook's Bad Luck

Mr. H. L. Brook, who was attempting to beat the England-Cape record in a Miles "Falcon," had a mild crash while landing after dark at Mersa Matruh, about 260 miles E.N.E. of Cairo. He was uninjured and will probably carry on to Cape Town in easy stages preparatory to making a fast return flight.

Held, Sir!

Two Russian parachutists leaped from a machine at a great height. One pulled his rip cord prematurely and the canopy of his parachute was torn on the tail of the machine. He fell and collided with his comrade, who managed to catch him round the waist. The double load was proving too much for the 'chute when, at 300ft., one man was able to open the reserve parachute of the other, enabling both to make a safe landing.

Twenty-five Years Ago

(From "Flight" of July 16, 1910)

"The first King to fly in an aeroplane is King Ferdinand of Bulgaria, who, on Friday of last week, made an aerial trip of a little over 7 minutes with the Chevalier de Lamine on his Farman biplane at Hasselt, in Belgium."

Correspondence

The Editor does not hold himself responsible for the opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

MOUNTAINS OUT OF MOLEHILLS

[3059] May I be allowed to take this opportunity of informing you of the facts relating to the forced landing of a Cirrus III "Hawk" in a cornfield near Staines on Wednesday morning of last week. Particularly am I anxious to make the position clear as this forced landing has been erroneously described in the Press [not in *Flight*.—ED.] as an "Aeroplane Crash."

I was piloting the aeroplane from Cowes, Isle of Wight, to Heston, and had just reached Staines Reservoir when engine trouble developed. One cylinder cut out entirely, and misfiring occurred on the others. We lost height rapidly, and, with the strong wind that was blowing that morning from the south-west, there was not a great deal of time to pick and choose a suitable landing ground. In point of fact there was very little choice apart from Staines Reservoir itself, some large pylons and high-tension cables, a belt of trees, or the cornfield in which we eventually landed.

After closing the throttle and turning everything off we glided down, and, turning into wind, made a perfect "pancake" landing on the corn. The machine ran for a few yards only and then gently nosed over, the wheels being completely jammed with corn stalks.

Some men engaged in building work near by kindly ran over and lifted the tail of the machine, which enabled us to get clear. My passenger suffered a few cuts and bruises, but I escaped without any injury at all.

Within a few minutes the local police arrived, to whom the necessary particulars were given. They were most helpful and kind and did everything to assist.

It was particularly unfortunate, therefore, that the Press reports should have described this forced landing as a "crash." At the time it did not occur to me that a forced landing could be of such public interest, or we would have taken steps to see that an accurate report was presented.

That we had an extremely fortunate escape we are the first to admit—there might not have been such a handy field in which to come down—and the fact that the landing was entirely successful I attribute solely to the extremely thorough instruction in forced landings procedure received from Mr. George Yuill, Instructor at the Lancashire Aero Club, to which I belong.

Aviation is still viewed with considerable mistrust by, probably, 99 per cent. of the population in this country, and, naturally, reports of aeroplane accidents must have their repercussions in the holding back of public confidence; but when an ordinary forced landing is reported as a "crash" one feels very strongly that misrepresentations of this kind should not go unchallenged.

As yet I do not know the cause of the engine failure, but the makers have promised to send a full report, of which I will advise you in due course.

Leek, Staffs.

J. H. MILLAR.

"AN ALLOY OF WIDE APPLICATION"

[3060] Your paragraph referring to "An Alloy of Wide Application" contained in *Flight* of June 20 must be of considerable interest to the designer or constructor who has to deal with matters of strength and durability.

I think where it is stated that "suitability for aircraft construction is not claimed" the meaning intended to be conveyed is that its "economic" use in this direction is perhaps a matter for consideration.

The question of economy embraces such matters as weight, strength, durability and cost, and it might not be out of place to consider the relative value of these factors. In the first place, it is of course vital, particularly in aircraft, that weight should be kept down to the very minimum—always provided that the necessary strength is preserved; the matter of durability also here comes into the picture, while cost, perhaps, takes a subsidiary place—at least within certain limits, provided the other factors are realised.

Where wood is giving place to metal in the building of the main body of aircraft it would be of considerable interest to know what is the relative weight of wood, say, to steel

required to be used to produce a machine of equivalent strength.

So far as Tungum is concerned the metal may be rolled to almost any degree of strength up to 100 per cent. greater than mild steel, while preserving the desirable properties in other directions, e.g., elongation, ductility, etc., and from this standpoint its use would bring about a reduction to some 50 per cent. in metal construction. It is all a matter of quality values, in which weight naturally plays a very important part with aircraft.

Jointly with the advantage of strength, Tungum possesses a high resistance to fatigue, and to all intents and purposes is immune from corrosion in the presence of salt air and sea water.

B. C. LAWS.

London, S.W.1.

RACING TURNS

[3061] I feel that in the report of the Leicester "do" and of the Grosvenor Challenge Trophy race the writer has perhaps exaggerated the evils of the all-but-vertical turn in a race for comparatively slow machines. The point, at any rate, is worth following up for the benefit of competitors in future air races.

Some speed is lost on any turn, and it is doubtful whether, with a slowish machine, the time lost in making a gradual turn is less than that lost in picking up one's speed again after a tight turn. With a 200-m.p.h. machine, conditions are approximating to those in the Schneider Trophy race, but a slow aeroplane's speed is quickly recovered.

In any case, even at 150 m.p.h., the resistance of the control surfaces either in entering or leaving a steep turn is not very great; the loss is surely caused by the greatly increased angle of attack as the machine is pulled round. Most pilots will, rather than risk slipping inwards when flying near the ground, pull their machines round more tightly than is actually necessary. In last year's King's Cup I noticed that practically all the pilots, some of the most experienced in the country, made steep turns at the Hatfield turning point.

In any case, it will be hard on the unfortunate spectator if he is to be denied his only "thrill"—that of spectacular work on the turn.

UNCLE REMUS.

Gravesend.

REVOLUTIONARY

[3062] The present moment, when the air fleets of the world are preening themselves, seems opportune for the following intimation that perhaps in the aeroplane and the helicopter we have not yet reached finality in aerial matters.

To the writer's personal knowledge at least one, Italian Professor of physics, one well-known German inventor, and one British inventor, are working on a machine which, when fully developed—as it almost certainly will be in the future—will outclass the aeroplane or the helicopter for warlike and general transportation purposes as these do any other aerial machine so far invented. It is not known how far other nations have advanced in the development of this hypothetical machine, but I can speak with first-hand knowledge of the progress made in this country, since I happen to be the British inventor referred to. Nearly ten years ago I had a talk with the Italian Professor, and from the little he disclosed of his methods I see no reason why he should not be quite as far, if not farther, advanced than myself, since he had access to financial resources which I have not.

As regards my own progress, for obvious reasons I cannot say very much beyond that on June 21, 1935, a patent was applied for on "Improvements in and relating to the Levitation of Matter." Before deciding upon this step I invited an electrician of fifty years' standing in his profession to view and criticise my preliminary levitation experiments, and upon his intimation that I certainly had something which did not come into his experience, I concluded that I had a novelty which may turn out to be of considerable importance not only from the electrician's, but also from the aviator's point of view.

(Continued on page 107.)

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS

R.A.F. STATION, HENDON

The duties of the Superintendent of the Royal Air Force Reserve and of the Officer Commanding, Royal Air Force Station, Hendon, have been established on a separate basis with effect from June 26, 1935.

R.A.F. STAFF COURSE, 1936

The dates of the terms of the R.A.F. Staff Course, 1936, are as follows:—1st term, January 21 to April 3; 2nd term, May 4 to July 31; 3rd term, September 21 to December 18.

CRANWELL

The "passing out" inspections of the Royal Air Force College and Electrical and Wireless School will be held on Friday, July 26, and Wednesday, July 31, respectively. Except in cases of emergency no aircraft from any other station is to fly within two miles of Cranwell aerodrome on these dates.

No. 3 (INDIAN) WING

No. 3 (Indian) Wing, Royal Air Force, moved from Quetta to Karachi on June 20, 1935, and with effect from July 3, 1935, temporarily ceased to function. Nos. 5 and 31 (Army Co-operation) Squadrons will be controlled direct by Headquarters, Royal Air Force, India. All correspondence for these units should be addressed to them, c/o The Officer Commanding, Royal Air Force Aircraft Depot, Drigh Road, Sind, India, until further notice.

MARRIED QUARTERS FOR NAVAL OFFICERS

A married officer of the Royal Navy who is posted to fill a vacancy on a R.A.F. establishment may, at the discretion of the C.O., be permitted to occupy a married quarter on repayment. A quarter appropriate to the relative rank of the officer should ordinarily be allotted and, although occupation will be on a voluntary basis, the officer will not be displaced by a senior officer who may subsequently join the station.

SELECTION OF AIRMEN AS PILOTS

The recommendations of airmen for training as pilots, which are due at the Air Ministry on October 1, 1935, should now be forwarded so as to reach the Air Ministry by September 1, 1935. The eligibility of airmen in respect of age and number of years unexpired service will, however, continue to be determined with reference to their age and service on October 1, 1935. Airmen with not more than five years' service (after completion of trade training) will be eligible for recommendation on this occasion.

TRANSFER OF OFFICERS TO THE RESERVE

The undermentioned short service and non-permanent officers should note that they become due in December, 1935, and January, 1936, for transfer to the reserve or (where indicated) for relinquishment of commission, on completing their period of service on the active list. Those marked† will relinquish their commissions and those marked* have been provisionally selected for permanent commissions.

General Duties Branch

Flying Officers.—Edward Ridley Short Johnston, *Hugh Whittall Marlow, James Rawlinson Wemyss, Frederick William Yates, Ronald James Bennett, Edward Reoch Berry, *Robert Calvert Richmond, Frederick Arthur Agar Hawker Strath, Raymond Ivor Burgess Winn, †Ronald Arthur Ramsey Rae, John Mortimer Warfield.

Medical Branch

Flight Lieutenant.—Arthur Harold Osmond, M.R.C.S., L.R.C.P.

Dental Branch

Flight Lieutenants.—John Graham Stewart, L.D.S., Joseph Johnson Lawson, L.D.S.

Statements from the medical and dental officers indicating whether or not they desire to be considered for an extension of service to five and ten years on the active list, respectively, are to be forwarded forthwith.

FOREIGN OFFICERS WITH THE R.A.F.

Capt. Bajan, of the Polish Air Force, was attached to the Central Flying School from July 2 to 5, and to the Royal Air Force Station, Tangmere, from July 8 to 10. Lt. J. Kjelstrup, of the Danish Air Force, is attached to the Home Aircraft Depot, Henlow, as from July 5, in order to undergo the second year of the Officers' Engineering Course.

FLYING ACCIDENT

The Air Ministry regrets to announce that P/O. Gerald Vincent Morse O'Reilly and A/C.2 Alexander John Hopkins, the pilot and passenger of a "Vildebeest" aircraft of No. 22 (Bomber) Squadron, Donibristle, lost their lives in an accident which occurred near Aberdour on July 22.

PERMANENT COMMISSIONS FOR MEDICAL OFFICERS

The undermentioned medical officers have been selected for permanent commissions, subject to physical fitness:—Flt. Lts. Leslie Scott Everett, M.R.C.S., L.R.C.P., George Gilchrist, M.B., B.S., and Ian Mackay, M.B., Ch.B., D.P.H.

RETENTION IN THE SERVICE

Owing to the increased requirements in personnel of the expanded Royal Air Force, it has been decided that airmen in all trades who would under existing standards be liable to discharge as physically unfit for air force service may be retained provided that they are fit for the duties of their trade at home and that retention in the service will not aggravate their disability. Detailed instructions as to the action to be taken have been issued to principal medical officers at home. This measure is of a temporary character and will be reviewed from time to time.

ROYAL AUSTRALIAN AIR FORCE

Mr. Parkhill, Australian Minister of Defence, announced the following forthcoming increases in the R.A.A.F. in a recent speech, namely, the formation of one General Purpose squadron at Laverton (Victoria), one coastal reconnaissance flight at Point Cook (Victoria), one squadron of the Citizen Air Force at Perth, and two G.P. squadrons, a Wing H.Q., and a stores depot at Richmond (N.S.W.).

R.A.F. BENEVOLENT FUND

The third Council meeting of the year was held at Iddesleigh House on July 3. Lord Wakefield was in the chair. The Hon. Treasurer reported that it is estimated the profit from Empire Air Day will produce approximately £4,500 for the Royal Air Force Benevolent Fund. Expenditure upon relief for the period May 1, 1935, to July 1, 1935, amounts to £2,031 15s. This represents an increase in grants expenditure of £1,797 18s. 2d. over the amount spent during the same period a year ago when the policy of restricted grants was still in force. The amount mentioned does not include the cost of upkeep of the Vanbrugh Castle School or the monthly subscription of £300 paid to the Officers' Association for the assistance of War Time R.A.F. Officer cases. The Hon. Treasurer reported that nearly 150 more applications had been dealt with during the period under review than during the same two months last year, and that the total number of applications dealt with during the half year of 1935 was greater than during the same period last year.

The fifty-three Royal Air Force casualties reported by India as a result of the Quetta earthquake necessitated immediate financial assistance being given to twenty next-of-kin, including five widows resident in this country, and another seven cases may shortly require help.

The Council decided to make known that the donor of what has been called the Anonymous Education Fund, was the late Colonel T. E. Lawrence of Arabia, and that this Fund should henceforward be known as the "Lawrence of Arabia Educational Fund" in grateful memory. This step was taken after previous reference to the Trustees and relatives of the deceased. It is recorded that under the administration of the Royal Air Force Benevolent Fund this gift

by the late Colonel T. E. Lawrence has since 1928 enabled educational assistance to be given to the children of officers of the Royal Air Force (in accordance with the terms of the Deed) amounting to a total of £4,000, and that in the year 1934 no fewer than forty-two children were being helped.

An American recently passing through London wrote specially to the Royal Air Force Benevolent Fund remarking upon the beauty of the Memorial Window in Westminster Abbey which was given by the mother of an American airman who was killed in air combat on August 24, 1918. The window was given as a memorial to the British Flying Services and is so placed as to light up the grave of the Unknown Warrior. It is thought that the existence of this window may be unknown to many who would be interested to see it. Unfortunately it has not been possible to keep in touch with the donor (Mrs. Louis Bennett) whose last known address in Weston, Virginia, U.S.A., is now unavailing.

The usual meeting of the Grants Committee was held at Iddesleigh House on Thursday, July 11. Mr. W. S. Field was in the chair, and the other members of the Committee present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Air Comdre. B. C. H. Drew, C.M.G., C.B.E., and Wing Comdr. H. P. Lale, D.S.O., D.F.C. The Committee made grants to the amount of £621 2s. 6d. The next meeting was fixed for July 23.

LONG SERVICE AND GOOD CONDUCT MEDAL

The Long Service and Good Conduct Medal has been awarded to the undermentioned airmen:—W/Os. Pitt, H. S. A., and Wallis, J. A., W.O.s Evans, H. R., and Kelly, W. C., Flt. Sgts. Bucknall, H. H., Farquharson, J., Frederick, N. W., Furlong, A., Lawrence, R., M.M., Maclean, E. W., Marshall, W. J., McIntosh, J., Osmond, C., Paxman, F. N., A.F.M., Scardfield, A. P., Summers, A. S., Woodthorpe, R. C., Sgts. Greenwood, F., Hampton, T. H. C., Hyde, E. A., Long, R. A., Mail, J. E., Mayo, E. A. V., Pearce, A. R., Steanes, H. C., Swannie, A. E., Tomlinson, F. G., Turner, W. F., Warnock, R. A., Wheeler, A. E., Cpl. Aves, H. J. W., Cpl./A/Sgt. Bayley, E. W. C., M.M., Cpls. Care, J. G., Coomber, F. C., Cornthwaite, H., Cpl./A/Sgt. Dendy, E. J., M.M., Cpls. Dixon, T. W. P., Fowke, J., Gallop, F. C., Rankin, H., Reeve, S. A., Robinson, G., Walford, C. J., Wilkes, E. J., Wilkinson, C. J., L.A.C./A/Sgt. Loxham, J., L.A.C.s Taylor, A., and Wright, E. I., A.C.s Culross, C. S., and Foot, W.

FORMATION OF THE LONDON UNIVERSITY AIR SQUADRON

The London University Air Squadron will begin to form on October 1, 1935. The squadron will come under the A.O.C.-in-C., Air Defence of Great Britain, in the Fighting Area, for administration and directly under the Air Ministry (Director of Training) for training. The controlling body on behalf of the University of London will be the Military Education Committee of that university. Flying facilities will be provided by the Station Flight, Northolt. The address of the town headquarters will be:—London University Air Squadron, Imperial College of Science and Technology, Kensington, London, S.W.7.

RE-EQUIPMENT OF UNITS

The following re-equipment of Royal Air Force Units has recently taken place:—

No. 7 (Heavy Bomber) Squadron...	"Heyford"	replaced	"Virginia"
"8 (Light Bomber) Squadron ...	"Vincent"	"	IIIF G.P.
"19 (Fighter) Squadron ...	"Gauntlet"	"	"Bulldog IIA"
"24 (Communications) Squadron ...	"Hart"	"	"Osprey"
"29 (Fighter) Squadron ...	"Demon"	"	"Bulldog IIA"
"202 (Flying Boat) Squadron ...	"Scapa"	"	IIIF F.A.A.
"208 (Army Co-operation) Squadron ...	"Audax"	"	"Atlas A.C."
"604 (County of Middlesex) (Fighter) Squadron ...	"Demon"	"	"Hart"/"Wapiti"
"4 Flying Training School ...	"Audax"	"	"Atlas A.C."
"1 Coast Defence Flight ...	"Osprey"	"	IIIF F.A.A.

The following Units are expected to commence or complete re-equipment during the next few months:—

*No. 101 (Medium Bomber) Squadron ...	"Overstrand"	replacing	"Sidestrand"
"210 (Flying Boat) Squadron ...	"Singapore"	"	"Southampton"
"3 Flying Training School ...	"Audax"	"	"Atlas A.C."
"3 Flying Training School ...	"Hart (T)"	"	"Atlas (T)"
"5 Flying Training School ...	"Audax"	"	"Atlas A.C."
"5 Flying Training School ...	"Hart (T)"	"	"Atlas (T)" and "Bulldog (T)"
"5 Flying Training School ...	"Fury"	"	"Bulldog IIA"
*Air Navigation School, Andover ...	"Prefect"	"	"Tutor"
			("Mongoose")
*No. 1 School of Technical Training, Halton ...	"Bulldog IIA"	"	"Siskin IIIA"

* Re-equipment of these units has already commenced.

ROYAL AIR FORCE GAZETTE

London Gazette, July 16, 1935.

General Duties Branch

The following Pilot Officers on probation are confirmed in rank on dates stated:—M. H. de L. Everest, May 16. D. C. Torrens, May 19. P. E. Meagher, June 22. The following Pilot Officers are promoted to rank of Flying Officer, June 16: C. R. J. Pink, D. E. B. Wheeler, R. G. Prier. Flt. Lt. A. J. L. Hughes is transferred to Reserve class A, July 13. The following Flying Officers are transferred to Reserve class A, July 12: T. A. Jefferson, A. H. Hole.

Accountant Branch

The following Pilot Officers are confirmed in rank and promoted to rank of Flying Officer, June 9: R. C. S. Allin, A. Gollan.

Medical Branch

Wing Cdr. H. B. Porteous, M.B., Ch.B., D.P.M., D.P.H., is placed on retired list, July 17. Flt. Lt. A. S. Burns, M.B., Ch.B., is placed on retired list (ill-health), July 15.

Dental Branch

K. G. Swiss, L.D.S., is granted non-permanent commission as Flying Officer with effect from and seniority of July 1.

PRINCESS MARY'S R.A.F. NURSING SERVICE,

Sister Emily Vera Lamb resigns appointment, July 12.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

Flying Officer G. A. Kennedy is confirmed in rank, November 12, 1933. The following are transferred from Class A to Class C: Flt. Lt. J. G. Murray, July 1. F/O. R. C. Berlyn, June 19. F/O. R. M. Henning relinquishes commission on completion of service, July 18, 1934. F/O. A. C. Lamb relinquishes command on completion of service and is permitted to retain rank, April 13. F/O. J. K. Day relinquishes commission (ill-health), July 17.

Erratum

In Gazette of July 2. Notification concerning F/O. W. R. Bailey. For Class AA(ii) read Class AA(i).

SPECIAL RESERVE

General Duties Branch

F/O. G. A. Worth resigns commission, April 18.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain (Acting Air Commodore).—P. C. Maltby, D.S.O., A.F.C., to Headquarters, R.A.F. Mediterranean, 24.6.35; on appointment as Air Officer Commanding vice Air Comdre. C. E. H. Rathborne, C.B., D.S.O.

Group Captain.—G. C. Bailey, D.S.O., to D. of E., Dept. of A.M.S.O., Air Ministry, 1.7.35.

Wing Commanders.—F. J. Linnell, O.B.E., to Dept. of A.M.S.O., Air Ministry, 15.7.35. F. W. Walker, D.S.C., A.F.C., to Dept. of A.M.S.O., Air Ministry, 15.7.35.

Squadron Leaders.—J. G. S. Candy, D.F.C., to Royal Air Force College, Cranwell, 11.7.35; for Engineer duties vice Sqn. Ldr. H. W. Heslop, O.B.E. R. M. Foster, D.F.C., to Headquarters, R.A.F., Iraq, Hinaidi, 11.7.35; for Air Staff Intelligence duties vice Sqn. Ldr. R. Jope-Slade, O.B.E., D.S.C. F. H. E. Reeve, to No. 57 (B) Squadron, Upper Heyford, 15.7.35; to command vice Wing Cdr. F. W. Walker, D.S.C., A.F.C.

Flight Lieutenants.—H. R. Dale, to No. 5 Flying Training School, Sealand, 8.7.35. G. F. W. Heycock, to No. 3 Flying Training

School, Grantham, 8.7.35. P. F. Canning, to No. 99 (B) Squadron, Mildenhall, 15.7.35.

Flying Officers.—J. S. Sabine, to R.A.F. Station, Heliopolis, Egypt, 28.6.35. R. G. Coventry, to No. 9 (B) Squadron, Boscombe Down, 9.7.35. J. W. Young, to No. 500 (Co. of Kent) (B) Squadron, Manston, 9.7.35. M. R. D. Trewby, to No. 7 (B) Squadron, Worthy Down, 27.6.35. H. W. A. Chesterman, to No. 24 (Communications) Squadron, Hendon, 16.7.35. A. D. Grace, to No. 24 (Communications) Squadron, 15.7.35.

Pilot Officers.—C. R. Taylor, to Air Navigation School, Andover, 11.7.35. W. W. Loxton, to No. 43 (F) Squadron, Tangmere, 14.7.35.

Acting Pilot Officer.—A. Flowerdew, to No. 70 (B.T.) Squadron, Hinaidi, Iraq, 25.6.35.

Medical Branch

Wing Commander.—F. J. Murphy, to R.A.F. Depot, Uxbridge, 12.7.35; for duty as Senior Medical Officer and Officer Commanding R.A.F. Officers' Hospital vice Wing Cdr. H. B. Porteous.

Dental Branch

Flying Officer.—H. M. G. Williams, to Medical Training Depot, Halton, 1.7.35; on appointment to a non-permanent Commission.

HERE AND THERE

British Machine Wins French Race : Modern Wing-tip Flare Equipment : Midland Club's Gathering : An Interesting Airscrew Invention : King's Cup News

An Anglo-French Success

THE race for the Coupe Armand Esders, which was completed on Saturday, was won by the Comte de Chateaubrun, who flew a Percival "Mew Gull" fitted with a French Regnier engine. An average speed of 188 m.p.h. was recorded. The race was over a distance of 1,046½ miles, from Deauville to Cannes and back. The Comte de Chateaubrun is the Percival Aircraft Company's representative in France.

A "Mew Gull," incidentally, has been entered by the Duke of Kent for the King's Cup Race, in which it will be flown by its designer, Captain E. W. Percival.

In its standard form the "Mew Gull"—a single-seater monoplane—employs a 200 h.p. "Gipsy Six" engine. Its top and cruising speeds are 210 m.p.h. and 185 m.p.h. respectively, and the landing speed, with normal load, is 58 m.p.h.

The Lowe-Wylde Fund

THE third list of donations to the Lowe-Wylde Memorial Fund is as follows:—

	£	s.	d.
Air Cdre. J. G. Weir	10	10	0
Capt. G. de Havilland	10	0	0
Aeronautical Educational Trust, Ltd.	5	5	0
R. F. Bulstrode	5	0	0
F. G. Nyborg	5	0	0
Lt. Col. H. Burchall	3	3	0
Dr. A. E. Slater	2	2	0
A. S. Butler	2	0	0
F. R. Banks	1	1	0
Norman Sykes	10	0	0

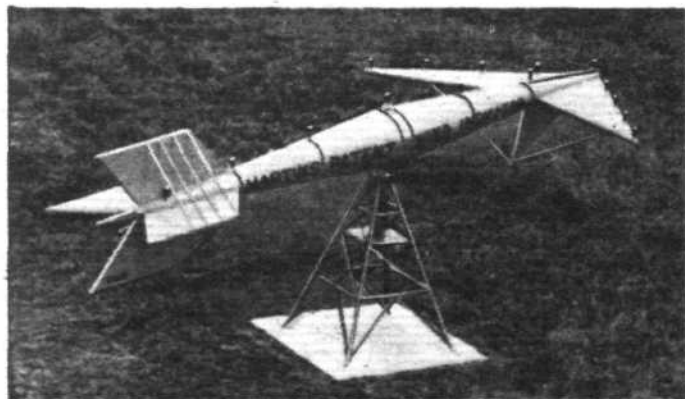
Donations were sent to Mr. E. C. Gordon England at the London Air Park, Feltham, Middlesex. The total amount received is now in the region of £340.

For Nocturnal Aviation

THE Holt wing tip flare is employed in military and civil aviation in all parts of the world. It has, in effect, a dual purpose, being suitable for use during forced landings in unknown territory or on badly lighted aerodromes; even at some of the best equipped it gives a useful auxiliary light.

In order to give more light under bad conditions, such as exist, for example, in India and Burma, the manufacturers have been aiming at increasing the candle-power of the light given by the standard flare. They have produced a new flare to specification Y.S.C.22/M. (approved) which gives, under test, approximately 30,000 c.p., whereas the older light was of only 7-8,000 c.p. For many locations, however, the older type gives ample light.

The popular Mark H.7 flare is completely water- and airtight and is fitted with an electric firing bridge or fuse which, if faulty, can be removed in a few seconds. Two screw pins serve to hold the flare in its bracket and also carry the current. Thus there are no loose wires to connect. The standard flare



Made in the works of the Martin-Baker Aircraft company at Denham, Bucks, this new Martin wind-indicator is exceptionally visible from the air. It is illuminated by electric lights for use at night. (Flight photograph.)



The "Mew Gull" which, as related in the adjacent column, won the Coupe Armand Esders Race in the hands of the Comte de Chateaubrun.

is charged to burn for two minutes, although, to special order, the company makes one of 75 seconds' duration.

There are two systems of flare installation in use—the single system, with one flare on each wing, and the twin system, which has two. In the former case a total burning time of four minutes is obtained, whereas the latter, which is recommended for installation on large machines operating on badly lighted routes, gives from eight to nine minutes.

The latest brackets have shields which protect the wing and prevent any dazzle from inconveniencing the pilot.

Col. Holt's patents (Col. Holt invented the Holt flare in 1915) are in the care of Mr. H. W. Gladwell, of the Y.S.C., Ltd., 13, Thavies Inn, Holborn, London, E.C.1, and that company can supply any information required.

A Midland "At Home"

THE Midland Aero Club was "at home" last Saturday and attracted quite a large gathering by air, in spite of unkind weather. A sealed time arrival competition, the first event, was won by Mr. Alex. Henshaw, flying an "Arrow Active." Nine competitors had entered for the Contact air race, and promptly to schedule the first man was sent off. This was J. L. Cave, flying a "Moth," who was followed at intervals, varying according to handicap times, by A. H. Tweddle ("Martlet"), H. W. Badger ("Hawk"), Miss E. A. Tyzack ("Cadet"), G. S. Davison ("Monospar"), R. Duncanson ("Hobo"), H. L. Johnson ("Puss Moth"), and A. Henshaw ("Active"). Miss R. Fontes ("Hawk Major") was last to leave, having a 31 min. 1 sec. handicap. The first landing control was at Meir, and others were Tollerton, Braunstone, and Sywell.

A Fly-past

After the race had started there was a fly-past, followed by an impressive display of air drill and formation flying by the "Harts" of No. 605 (Bomber) Squadron, A.A.F., who were not in the least put out by the bumps and gusts, a point keenly appreciated by the spectators.

Capt. W. Percival rocketed about with the "Gull" which took him to Oran and back recently, while Mr. R. A. C. Brehung in the air in a C.30 Autogiro. The performance of the new "Hornet Moth" excited great admiration, and Mr. Buckingham showed it off to perfection by keeping over the crowd as much as possible.

And then, amid great excitement, the first machine home in the race was spotted. It proved to be Duncanson's pretty blue "Hobo." It had averaged 98.75 m.p.h. and won the large Challenge Cup and Memento Cup given by Contact.

Next was Miss E. A. Tyzack, who was nearly overhauled on the line by H. L. Johnson. Four competitors had retired, the remaining finishers being Mr. H. W. Badger and Miss R. Fontes.

Mr. "Tommy" Rose, in a Miles "Hawk," and Mr. George Lowdell, in a Wolseley-engined Hawker "Tomtit," wound up the flying programme by bombing a car with flour bags.

The prizes were then distributed in the clubhouse by Mrs. Dennison, wife of the president.

Here and There :—

The Viceroy's Challenge Cup

THE Aero Club of India and Burma announces that the Viceroy's Challenge Trophy Air Race will be flown on February 14 and 15, 1936, over the following course: Madras, Hyderabad, Bombay, Ahmedabad, Jodhpur, Delhi. This is a distance of 1,485 miles, to be flown in two days with a night stop at Bombay.

Their Excellencies the Earl and Countess of Willingdon have consented to present their Trophy and other prizes at the Civil Aerodrome, New Delhi, on the evening of February 15.

The Trustees of the Irwin Flying Fund have donated a sum of Rs.10,000 towards the prize fund, which now amounts to Rs.12,000. A special prize of Rs.2,000 is to be given to the first "A" licence pilot wholly trained in India to pass the winning post. Besides the Trophy, a number of other valuable cups and trophies have been presented.

The race is open to British subjects or residents in India, but entry is confined to British-manufactured machines, registered in the British Empire.

Conclusive?

AS some readers of *Flight* may recall, among the inventors working in this country on the problem of the helicopter is Capt. Victor Dibovsky. He has now adapted the twin-propeller principle of his helicopter for orthodox aeroplane propulsion, and claims to have achieved some remarkable results.

Captain Dibovsky terms his device a "High-efficiency twin air propeller with differential self-balancing transmission." To describe it in detail—even were the inventor to disclose the mysterious nature of the "differential"—would require a great deal of space, but it can be said that *Flight* has witnessed a demonstration in the inventor's laboratory at 106, High Street, Camden Town, London, N.W.1; the twin propellers (he will not have them called airscrews), which revolved in opposite directions (and not at constant speed), were driven by an 8/75 h.p. racing motor cycle engine on a dynamometer test bed, and the effect was impressive, if only by reason of noise and draught.

The most interesting fact is that Capt. Dibovsky claims that, on the accepted efficiency formula, his device not only gives more than the usual 86 per cent., but over 100 per cent.—which, as both he and Euclid said, is absurd. He therefore maintains that the accepted formula is a false one.

"Hawks" in the King's Cup

MILES "Hawks" form a large proportion of the entries so far received for the King's Cup Race this year. Those entered by Major Allen and Mr. R. Cornwall are of particular interest as they are the first of the new "Hawk Trainers" which will be used for the R.A.F. Reserve Training School which is being opened at Reading in November. This type differs from the "Hawk Major" in that the fuselage has been increased in width by 3in. and the span by 1ft., giving an extra wing area of 6.4 sq. ft. These modifications reduce the landing speed, and at the same time provide ample room in the cockpits for parachute seats and other necessary train-



Mrs. Pakenham, who is well known as an expert pilot at Heston. She is in charge of the Sales Department of the Martin-Baker Aircraft firm. (*Flight* photograph.)

ing equipment. All metal fairings have been increased in gauge and particular attention has been paid to details, so that maintenance costs will be cut to a minimum.

From the "Trainer" another type known as the "De Luxe Hawk Major" has been developed, and two of these are entered by Mr. S. A. Sadler and Mr. A. J. Cook. Both these machines are luxuriously upholstered and have hydraulically operated flaps and many other refinements. Mr. Cook's machine will also have a coupé top.

Viscountess Wakefield and Mr. S. Harris are both entering new versions of the Miles "Falcon." These machines have "Gipsy Six" engines. The cabin is the same as that of the standard "Falcon," seating four people, and, from the point of view of finish and interior comfort, they will be very luxurious. The price, incidentally, will only be £1,325.

Mr. F. G. Miles himself is going to fly a "Hawk M.V.," but very little news is available concerning this machine as yet.

Three "Gipsy Six" single-seater "Hawks" have also been entered; that of Mr. W. Humble is the same machine which Sir Charles Rose flew last year; Mr. L. Fontes' entry, which gained second place at Leicester the week before last, is identical; and that of Miss R. Slow is practically the same, with the exception of a few minor modifications.

Grosvenor Trophy Echo

MR. G. S. DAVISON'S Monospar, which averaged 100 m.p.h. in the Grosvenor Challenge Trophy Race (reported in *Flight* last week), was a veteran S.T.4 and not, of course, an S.T.25.



FOR DUTCH COLONIAL SERVICE: A Rolls-Royce "Kestrel"-engine Fokker C.X two-seater of a type which is being supplied to the Dutch Colonial Air Force. The particular machine shown here has a 525 h.p. "Kestrel IIS" but the production models are receiving "Kestrel Vs" of 600 h.p. At the critical altitude a speed of 205 m.p.h. is attained.

Here and There:—**The Science Museum and Aeronautics**

A SECOND edition (revised and enlarged) of the Science Museum handbook dealing with the development of mechanical flight from the beginning up to the present day—"Handbook of the Collections Illustrating Aeronautics—I. Heavier-than-air Aircraft, 1935"—has been prepared by Mr. M. J. B. Davy, A.F.R.Ae.S., of the Science Museum, and has been published by H.M. Stationery Office (price 2s. 6d., by post 2s. 9d.). Copies may now be obtained from the Science Museum, South Kensington, London, S.W.7, or from the sale offices of H.M. Stationery Office.

Handbooks of the Museum collections illustrating aeronautics—"II, Lighter-than-air Aircraft" (price 2s. 6d., by post 2s. 9d.), and "III, The Propulsion of Aircraft" (price 2s., by post 2s. 3d.), have also been published. They form, with the revised publication, a comprehensive survey of the history and development of practical aeronautics.

The College of Aeronautical Engineering

STUDENTS of the College of Aeronautical Engineering continue to maintain the name of the college by the excellence of their work and the places they gain in the many examinations for which they are prepared. For example, in the examinations for Associate Fellowship and Associate Membership of the Royal Aeronautical Society, which were held in May of this year, the students of the college gained five first places.

Already the principal of the college is finding that the demand for thoroughly and properly trained students is so great that he is unable to supply all those concerns which have vacancies available. Imperial Airways are but one of

the companies which are finding that a properly trained man is worth a great deal more than one who is not so well equipped. Although the college only opened in October, 1931, and the first student did not qualify until April of last year, already twenty-three students have been placed, as the following list shows:—

Lecturer, Witwatersrand Technical College, S. Africa; chief engineer, Cinque Ports Flying Club; assistant to chief engineer, Imperial Airways; assistant to superintendent, Imperial Airways; ground engineer, Aberdeen Airways; technical assistant, Royal Aircraft Establishment; second pilot and engineer, British Air Navigation Company; research engineer, British Aeronautical Company; inspector, Heston Aircraft Company; aircraft, wireless and electrical engineer, Hawkers, Ltd.; inspector, Phillips and Powis; ground engineer, Sir Alan Cobham's Air Display; ground engineer, Imperial Airways; ground, engineer, Cinque Ports Flying Club; ground engineer, Cotswold Aero Club. Other concerns are:—British Aircraft Mfg. Company; Pobjoy Airmotors, Ltd.; Airwork, Ltd.; General Aircraft, Ltd.; Short Bros., Ltd.; Brooklands Aviation, Ltd.; A. V. Roe, Ltd.; Percival Aircraft Company.

De Havilland Products

ALL De Havilland products and facilities are described in a small handy-sized booklet recently issued by the De Havilland Aircraft Company. A limited number of these booklets are available to people interested in aviation, and application should be made direct to the company at Hatfield Aerodrome, Herts.

Incidentally, visitors to England will be interested to know that the company always welcomes them if they care to go to Hatfield.

Another De Havilland publication, just issued, is a prospectus dealing at length with the tuition available at the D.H. Aeronautical Technical School.

CORRESPONDENCE

(Continued from page 102)

Before going further I may mention that my experiments have nothing whatever to do with the alternating current levitation experiments of fifty years ago. I do not use alternating current, aluminium or copper discs, nor any coil of the usual electro-magnetic type. My results are obtained with a special levitor connected by one wire with a high potential electric source, the other being earthed or connected to a high-capacity condenser. The technique is thus more nearly related to modern wireless methods than to the old quadrature experiments. Personally, I regard my work as indicating a method of transforming electrical energy into some new form which directly interferes with the weight of matter, and not only interferes but actually reverses gravitational influences. In other words, I have found that when one of my levitors is suspended at any distance from the electrical source (five yards is as far as I can get in my laboratory) and connected therewith by one fine wire, it is actively repelled from the earth, floats in the air, and carries up with it additional weight which I have the following reason for thinking may be increased indefinitely.

In the course of my experiments I have found that four factors enter into the determination of the weigh-lifting capacity of my levitors, and since two of these are susceptible of practically infinite variation, I conclude that the capacity may be varied indefinitely. For instance, taking one of the factors, say X, I have determined that as this X increases the lift increases—not directly as X, but as some multiple of X. Thus, if X gives a lift, W, by increasing X to 2X we get 3W lift. Similarly, varying another factor, Y, I find that by increase of Y to 2Y I get 4W lift instead of 2W as I expected.

Now the point I wish to emphasise is this: My experiments, whatever the cause of the effect, certainly indicate a new lifting power, and since the factors X and Y are amenable to modern wireless treatment, it is conceivable that this lifting power may eventually be so far increased as to become of practical utility in the world of aviation. I am at present applying only a minute power (about 5 amp. at 220 volts), and what has still to be learned is how to apply powers of any magnitude whatever. A modern aeroplane transforms a certain h.p. into lifting power through the medium of its planes. Transforming this same h.p. into electricity and then into lifting power through the medium of my levitors, it is conceivable that the machine of the future will need no planes; and since velocity will not be required in the process

of transformation, as in the aeroplane, this machine will be able to rise up vertically to any desired height, and from any position on the earth's surface.

The electrical method may cost more h.p., but this is by no means certain. After all, the planes in providing lifting power are fighting gravity through an indirect action on the air; whereas the electrical method will act directly on the forces implicated, and with further knowledge may prove more economical and, at the same time, have other important advantages.

W. D. VERSCHOYLE.

London, S.W.13.

[A member of the staff of *Flight* has watched a demonstration of Mr. Verschoyle's apparatus. He reports that there is no doubt whatever that the "levitors"—which are small paper cylinders containing simple electrical apparatus—do rise in the air when the potential is applied to them by the thin wire, which they actually tend to lift also. The experiments appears to be convincing, though probably of more interest to the electrical engineer than to the aeronautical engineer at the present stage of progress.—ED.]

IN BRIEF.

Mr. K. G. Newham (London, W.C.2) writes in appreciation of efficient and enterprising service which he received as a passenger on the Paris-London service of Hillman's Airways, Ltd.

Mr. R. Mitchell-Lanman states that he would like to hear from anyone interested in the formation of a gliding club near London. His address is 29, Minster Road, West Hampstead, London, N.W.2.

Flight last week quoted a *Pou-du-Ciel* constructor's remark that the building of these machines would be greatly simplified if finished components were available. Mr. T. B. Wood, who is having a machine built at Hampton-on-Thames by a skilled aircraft woodworker, writes to say that he can supply a number of parts, not only metal fittings, but wing ribs, etc. He is also prepared to construct complete machines at a price of approximately £95, plus £45 for a Scott or Douglas engine. Mr. Wood, whose address is Flat No. 418, Mount Royal, Marble Arch, London, W.1 (Mayfair S040), would be pleased to give advice to other *Pou-du-Ciel* builders.



Private Flying

Topics of the Day

Trials and Tribulations

SOME day the instructors of struggling little clubs will receive all the praise they deserve. All clubs have had their difficult times, and, with their finances at low ebb, an instructor-cum-secretary and a ground engineer-cum-barman have often had to carry the whole business on their shoulders.

Even among comparatively prosperous clubs the chief instructor still has the greater part of the responsibility for keeping members together and for keeping pupils interested—quite apart from his special responsibility in the matter of flying safety. In fact, the casual member, who feels hurt because he is not allowed to go straight off solo on any particular day, can very rarely realise how a chief instructor would feel if he *did* turn the machine over on to its back. Even if the pilot is unhurt the club must manage without one of its only too valuable machines, innumerable members will be disappointed after booking in advance, and broken propellers and cracked engine bearers are not cheaply replaced.

An instructor must be a mind-reader and a psychologist. He must make the pupil confident yet not over-confident; he must discover in a single practice circuit whether the pupil is in good fettle; and he must prevent him from being over-ambitious without allowing him to become bored.

The Small Club

A FEW days ago I was chatting to the one and only instructor of a small club in a manufacturing district which has felt the depression to a considerable extent. This club has been in various hands since it was originally started in the dark ages of what was then known as the "Light 'plane movement," and only now is it showing signs of approaching prosperity.

The district is one of quaint social survivals where Mr. Smith and Mr. Jones must not, on any account, be brought together, and where Mrs. Brown does not talk to Mrs. Green. Young Mr. Robinson is flying without the consent of his father, who, nevertheless, is a useful ground member of the club and a persistent visitor; if Mr. Robinson Senr. discovered that his son was already ripe for a first solo the latter's allowance would be reduced sufficiently to make flying very difficult. Such problems could be indefinitely multiplied and complicated.

Furthermore, the aerodrome is publicly owned and the varying political shades of red and blue cause similarly varying municipal support or otherwise to be given to the club. Curiously enough, the attitude of the "powers that be" towards the club does not appear to alter in the expected manner as the colour changes!

This instructor, therefore, has the fullest of full-time jobs in keeping his flock together, in pacifying various people, and in arguing with sundry councillors. Then, of course, he has his instructing to do. Let us strike a special medal in our hearts for him.

Starting at the Beginning

IT is probable that most amateur pilots, in their search for new skill and in their desire to give themselves a brand new flying sensation, learn to make quite good loops long before they have really mastered the art of the graduated steep turn. In fact, very few pilots with less than fifty flying hours to their credit can make steep turns that are accurate enough to please a careful instructor.

However spectacular a loop may appear it is really the simplest of evolutions, and a perfect one requires nothing more than a little careful rudder and properly applied backward pressure on the stick as the machine goes over. Twenty minutes' practice will enable the least skilful person to jostle in his own slipstream every time.

The perfect steep turn requires only less careful control co-ordination than a good slow roll, and, like the latter, is a good test of real flying ability. It is comparatively easy to jerk a machine with good lateral control into a vertical bank, to pull it round, and to "opposite everything" with the stick forward when coming out again. But allow the bank and turning rate to increase through the first 180 degrees of turn and then try to ease out gradually on to a definite landmark; most amateurs will find it surprisingly difficult to carry out cleanly.

Practice Makes Perfect

THERE are a great many other simple evolutions which are well worth some quiet concentration at a safe height and at a safe distance from the aerodrome. Some pilots never learn to make gliding turns, or even to glide straight, at a steady speed.

Since speed in the glide is most important, and, at the same time, most difficult to judge when near the ground, "upstairs" practice is not too helpful, and many clubs very rightly insist that forced landing approach practice away from the aerodrome should only be carried out with an instructor. Gliding turns are not encouraged as part of an approach to a crowded aerodrome. However, half an hour in forced landing dual is never wasted flying time.

Most people, in their novitiate and with a rightfully exaggerated fear of the stall, manage to increase their speed in a straightforward side-slip, and many amateurs of long experience still whistle into an aerodrome out of a slip at a most unreasonable speed. Straight and "crab" sideslips at a constant speed cannot be practised too often. Engines still fail over country which contains only small fields.

Needless to say, it is possible to get into trouble through using too much rudder in a "crab" sideslip, though this form is a very useful one when approaching a strange aerodrome, as it allows a very much better view. In the normal sideslip one can, if the speed drops, feel that the aileron control is weakening. Experiments at a safe height will at least give a pilot an idea of the danger point, and of the control required for maintaining a constant speed.

INDICATOR.

FROM THE CLUBS

Events and Activity at the Clubs and Schools

LIVERPOOL AND DISTRICT

Flying returns for the past fortnight show that 183½ hr. have been flown.

HATFIELD

At the London Aeroplane Club flying time last week was 146 hr. Messrs. D. E. Rae, J. R. Glead and C. G. Fisher completed the tests for their "A" licences, and Messrs. W. B. Feeny, C. G. Clegg and T. Y. Craster made their first solo flights.

BRISTOL AND WESSEX

Dr. R. D. Bodman completed the "A" licence tests during the week, and Mr. A. R. Lind made his first solo flight. Mr. Lind, who has been given a flying scholarship by the Air League of the British Empire, is the first Air League scholar to fly solo at Bristol.

Miss D. Follett and Messrs. O. T. Lashmore and L. Pratten have become pilot members.

CAMBRIDGE

On Sunday ten members of the Civil Aviation Service Corps came along and seven flew, bringing the week's flying time up to 34 hr. 10 min.

The "Puss Moth" has been to France twice during the week. One of the Club's private owners has taken delivery of a new B.A. "Swallow," which has been greatly admired by everyone.

MIDLAND

Club machines have made cross-country flights to Sywell, Braunstone, Whitchurch and Horton.

Messrs. C. H. Curtiss, H. V. Collins, A. F. Hill, D. Moore, T. A. Jefferson, and J. Tavana have become members, the last three in the flying category.

Dual instruction occupied 16 hr. 10 min. last week and 31 hr. 35 min. solo flying was logged.

YORK COUNTY

The summer ball, held last Friday night, turned out to be an enormous success. Over 300 guests were present, and many people flew to Sherburn for the event from aerodromes throughout the country. An excellent display of flying was given before the dancing commenced, but was marred somewhat by heavy rain. It has been decided to establish the ball as an annual event.

Members of the Mess of No. 26 (A.C.) Squadron at Catterick attended, together with Sqn. Ldr. Ambler from Thornaby, Sqn. Ldr. Ivo Thomson, who gave his usual display of aerobatics, F/O. Humble, F/O. Wilson, Capt. Cudemore, Messrs. Robert Blackburn, J. Scholes, Dick Holme, Alex Henshaw, and many other well-known personalities in aviation.

YORKSHIRE

Club aircraft flew a total of 49 hr. 10 min. last week; flights to and from Brough, London, Newton House Aerodrome, Blackpool, and Nottingham were made.

The Aviation Group is growing steadily, while the Club's new flying scholarship scheme is also obtaining substantial support. Candidates have to take a trial lesson costing 10s., and the most promising beginner will be awarded free "A" licence training at Yeadon. Already sixteen people have taken trial lessons.

New members are Mr. John Davy, Mrs. Aykroyd, and Miss Aykroyd. Mr. B. A. Robinson, of the Aviation Group, and Dr. H. A. Kidd, of Halifax, have made their first solo flights.

Mr. W. Adams, a member of the Club, who recently sold his "Moth," has now purchased in its stead another machine of similar type.

A garden party will be held at Yeadon Aerodrome on July 28, at 3 p.m.

HANWORTH

The Chief Instructor, Flt. Lt. R. Duncanson, won the *Contact Air Race* with Lord Patrick Crichton-Stuart's "Hobo." This is the fourth race won by this machine.

Quite a number of members flew to Portsmouth during last week in order to inspect the Fleet from the air.

Miss I. Goulding, Captain L. Hutcheon, Dr. N. C. Gane, Major D. F. Osmaston and Mr. F. G. Bernage, have become members.

Flying time last week was 56 hr. 45 min.

At the Autogiro School the total flying time was 43 hr. 10 min. New pupils are Mr. C. Altschul and Mr. A. C. Gazdar, the latter being Chief Instructor to the Bombay Flying Club.

Mr. A. Batchelor went to see the Naval Review in his own C.30, and Mr. Schmidt-Crans left for Holland after a visit with a Dutch C.30.

No fewer than 1,184 hr. have been flown by machines operated from Hanworth during the first six months of this year, which is an increase of nearly 300 hr. over the same period last year.

TOLLERTON

Club machines have made cross-country flights to Skegness and Leicester, contributing to the week's flying time of 30½ hr.

First solos were made by Mrs. K. R. Davis, Mr. J. G. Pain and Dr. P. Wilkinson. Mr. E. S. Bonser qualified for his "A" licence.

HERTS AND ESSEX

Mr. S. Rendall, one of the Club's ground engineers, and Mr. Philip Corner, have made their first solo flights, and Mr. N. C. Khanna has obtained his British "B" licence.

New members are: Messrs. H. J. Logan, W. T. Tracey, G. Crump, E. Gabbay, L. H. Hooper, N. M. Solomonides, R. C. Downe, C. H. Ewin and H. J. Murphy.

Club machines flew 75 hr. 1 min. last week.

REDHILL

Last week 65 hr. 35 min. flying was logged. Four new members joined the Club and three machines visited Portsmouth for the Naval Review. Two others flew to the new Municipal Aerodrome at Ramsgate for the inauguration of the new Hillman service.

Two further blind-flying certificates have been obtained and the chief instructor, Mr. R. F. Bulstrode, has been appointed to the Guild of Air Pilots and Navigators Panel of Examiners.

BROOKLANDS

Good weather has brought the flying times up for both dual and solo, and a record week is expected. It is interesting to note, incidentally, that the membership to date is 665.

New members are Messrs. Banford, Parsons, Sahney, and Mills. Messrs. Morris and Prince are going in for their "B" licences, and Mr. Bolt, of Cook Strait Airways, New Zealand, is now taking his blind-flying course. The Dragon "Rapide" belonging to the Ethyl Corporation, is back in service and is flying from Brooklands again.

Miss de Zoucho has renewed flying again after an absence of two years in Geneva. Visitors to the aerodrome include Lady Hoare, and Mr. Topham, who flew over from the South of France in his Miles "Hawk."

CINQUE PORTS

The longest bar in the South of England is now in full use at the Club and the new lounge is in great demand by the two hundred and forty members.

New members who joined last week were Messrs. B. R. Clarke, F. W. Gandon and D. Constant. Flying time for the week was 64 hr. Several members have been taking instruction in blind flying and there has been a great demand for joy-riding.

El Bimb G. L. Prendergast has returned from the Sudan in his "Leopard Moth." Interest was not lacking in one of the new Caudrons flown by M. Gerard, from Paris.

No. 601 Auxiliary Squadron have arrived for two weeks' intensive training. The Squadron will also spend four days at Tangmere to co-operate in the manoeuvres.

KARACHI

During June flying time amounted to 177 hr. 55 min. June, of course, is not a particularly pleasant month for flying, even in Karachi, and the strong westerly winds, which do so much to mitigate for residents in this city the unpleasantness usually associated with the hot weather in India, are a source of considerable embarrassment to pupils. However, *ab initio* pupils put in a total of some 62 hr. flying during the month.

The pilot instructor, Mr. N. G. Gadgil, with the hon. secretary, flew over to Jodhpur in the "Leopard Moth" at the beginning of the month in order to take delivery of a "Gipsy II Moth" purchased from the Jodhpur Flying Club.

A few cross-country flights were undertaken by members on business and by members training for their "B" licences.

CARDIFF

Flying time for the week ending July 8 was 22 hr. 5 min., and from July 9 to 15 it was 24 hr.

On July 10 the Marquess of Kildare and a passenger arrived and cleared customs for Ireland. Lord Kildare was returning on July 12, but had to make a forced landing near Bury Port, damaging his airscrew. He went on to Cardiff by train and left by special charter of a Western Airways machine for Brooklands.

Mr. G. S. Pine has now qualified to take up passengers, having completed his 20 hr. solo flying.

Mr. C. F. Upham and Mr. D. H. R. Morgan are new flying members, while Mr. H. Coward and Mr. J. Jones-Davies, the latter representing Cambrian Airways, have become social members.

Mr. S. K. Davies has recently received his new Miles "Hawk," and has made several flights to London and back, and to the north of England.

Private Flying

WITNEY AND OXFORD.

Of the 14 hr. flying logged last week, 10 hr. represented solo flying. Two Club machines visited the Leicester opening on Saturday and a number of members went by road.

Miss P. A. N. Waldron has become a member of the Club.

READING

Mrs. Battye and Mrs. MacDonald have flown from Le Bourget to Cannes, crossing the Alps at 12,000 ft. Their time was 3 hr. 25 min.

Among the new pupils are Mr. A. E. N. Jones, Mr. Bear and Mr. Segal. Mr. Flower has gone solo and Mr. Carpendall has returned to renew his "A" licence. Mlle. Braescu is putting in a good deal of cross-country flying.

The new "Falcon" with "Gipsy Six" engine has made its first test flight, and Mrs. Battye has taken delivery of her "Hawk Major." Squadron Leader and Mrs. McGregor are staying at the Club.

Last week's flying time totalled 48 hr. 30 min.

RANGOON

The flying time for May (68 hr. 35 min.) shows an increase of 10 hr. 45 min. over that for April. There is one new pupil, and one new first soloist.

On May 1, the Burma Flying Club was informally opened. At present the Club is housed in a bamboo and mat hut and there are about thirty members.

One of the Rangoon Club's machines is being equipped for blind flying.

LONDON GLIDING.

In spite of the inevitable disturbance created by the building of the new clubhouse, there has been considerable activity at Dunstable during the past month. Membership is increasing steadily and pupils under instruction have accounted for twenty-one Royal Aero Gliding Certificates. Two more members have now acquired their own machines, bringing the total number of privately owned machines to eighteen. Two further machines are under construction for members and, in order to meet the demands of increased membership, the Club itself has three more machines on order. Preparations for the Summer Camp (August 1-14), are well under way, and forty-five definite bookings have been received. The first week of the Camp is now fully booked up, and there are four vacancies left for the second week.

Early morning flying at the week-ends is proving increasingly popular and has commenced as early as six a.m. on several occasions recently. A party of members is being organised to visit the Derbyshire gliding sites at the end of July, and is likely to be accompanied by two or three machines. Amongst the sites to be visited is Eyam Edge, near Matlock, which was used by Mr.

Robertson (a member) at the commencement of his flight to York last month, a distance of fifty-one miles. During this flight Mr. Robertson reached an altitude exceeding four thousand feet, and thus concluded his tests for the coveted "Silver Sea" badge. Mr. Robertson thus becomes the third British holder of this international honour, all the British holders having been trained by the London Gliding Club.

Flying activities have continued steadily throughout the past month, a record week's flying time being recorded for the week ending July 7, with a total of thirty-seven hours. The outstanding flights of the month were made on Saturday, July 6, when Messrs. Wills and Bergel made cross-country flights to Heston (thirty miles) and Hornchurch (forty-one miles) respectively.

There are now a number of vacancies in the instructional groups, and those interested can obtain a well-illustrated booklet giving full details of membership by applying to the Secretary, London Gliding Club, 13, Victoria Street, S.W.1.

NORTHAMPTONSHIRE

On Sunday, July 21, the members of the Northampton Chamber of Commerce and of the Rotary Club of Kettering and Rushden were entertained by Captain G. R. D. Shaw, the Club's chairman, to tea at the Aerodrome. During the afternoon a display of flying was given by Lord Willoughby de Broke, Mr. George Lowdell, with a Hawker "Tomtit," and Messrs. Jack Linnell, Perry Tyzack, E. C. Goldsmith, Barrett and Donaldson.

One new flying member, Mr. C. Rawson, commenced his instruction during the week, and Messrs. Wareing and Gent have become members.

AIR SERVICE TRAINING

The flying instruction given at A.S.T. recently has considerably increased, and some 2,194 hr. were logged during May and June. Hamble has enjoyed good weather and only on one or two days in the past two months has it been necessary to curtail the flying training. Occasionally a pupil found himself kept at a distant aerodrome by fog, but generally there have been few interruptions.

The work on hand has been very heavy—apart from Reserve training. A new three-year course commenced early in May, and during June several would-be instructors joined the School for the flying instructors' courses. Blind-flying courses continue to be in demand.

The Air Ministry Second-Class Air Navigators' Examination held in March yielded 100 per cent. successes for A.S.T. candidates. The demand for "B" licences has necessitated special ground courses to coach for the oral technical examination.

Mr. C. J. Melrose, of England-Australia fame, took a seaplane course and many well-known pilots have done blind-flying courses. Mr. Schmidt Crans came from Holland to study the organisation of an English flying training establishment.

ORAN TO KHARTOUM

Some Incidents During the Duchess of Bedford's Recent African Flight

AS reported in *Flight* some weeks ago, Her Grace the Duchess of Bedford, with Flt. Lt. R. C. Preston, her pilot, recently made a very interesting African trip in her "Puss Moth." Some further details are now available.

Starting from Oran—having arrived there *via* the coast of Spain, with Valencia as the last port of call—they went *via* Beni Abbes, Reggan and Gal. Crossing the Sahara is apparently not quite so terrifying as is supposed, but it is not a trip to be taken lightly, and the French authorities ensure that adequate precautions are taken. Before the flight can be started it is necessary to obtain permission in writing from the Algerian Government to use the route. Ten thousand francs have to be deposited with the Compagnie Generale Transaharienne in order that assistance may be assured in case of a forced landing. It is also necessary to have radio equipment, or, if that is not carried, an escort has to be arranged from Colomb Bechar to Gal. The Transaharienne Company run Caudron "Phalenes" across this stretch at about ten-day intervals, and, if the crossing is made in their company, no further charge is incurred.

Between Algeria and the Niger river there is a motor road which can be followed to a certain extent, but it is extremely unwise to lose it, as the country is somewhat featureless. On the route to Gal lies the Bidon Cinq, that famous refuelling station which is some 300 miles from anywhere, and the last stop is usually made there. After a diversion to Timbuktu, the Duchess then carried on to Niamey, the capital of the French Niger Colony, where there is a magnificent aerodrome, and after a night's rest went on to Kano, the point at which the Niger river is left.

The French and Belgian lines apparently keep to north of Kano, using Zinder as their port of call, consequently the residents of Kano were very glad to see the Duchess arrive, and to entertain her. The next stop was Fort Lamy, and after

a night there the journey was continued to Abehhr, the final halt in French equatorial Africa before reaching the Sudan.

El Fasher should have been the next stop, but rather thick weather and lack of landmarks made them uncertain of their exact position, so at six o'clock, when the sun was beginning to look like setting, they decided to land in a wadi and spend the night. Just when composing themselves for sleep some Arabs arrived and produced eggs, milk and fowls, which were cooked on the spot—a "party" which was felt to be an admirable wind-up to a rather trying day.

Next morning it was found that El Fasher was only fifteen minutes' flying away. Here the Sudan authorities insist upon disinfecting machines in order to obviate the possibility of importing yellow fever or other diseases.

The final flight from El Fasher was *via* El Obeid to Khartoum. The journey home is, as Flt. Lt. Preston so aptly says, merely flying along a well-worn tramline, and therefore does not merit description.

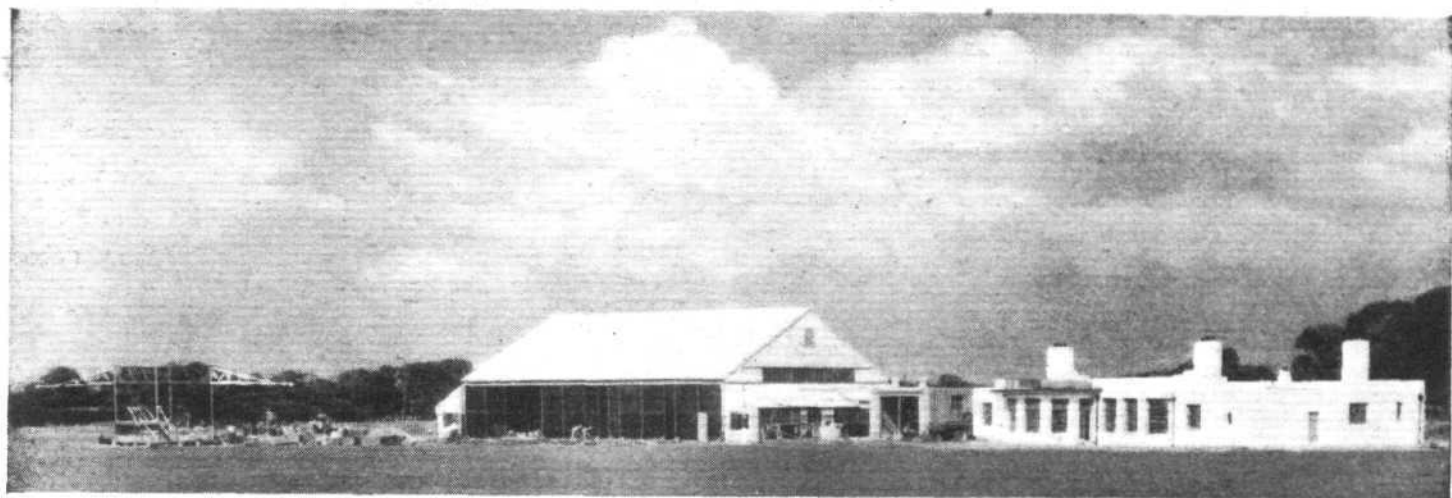
We have already described other journeys made by the Duchess of Bedford, the present merely going to show that she is probably keener on flying, and does more to uphold the prestige of British private aviation than anyone in similar circumstances.

Soaring Short Waves

RADIO equipment will be available at the Elmira (U.S.A.) gliding contests which will enable contestants to converse with ground stations as well as with other pilots in the air, and thus exchange results being obtained while soaring. The Elmira Radio Amateur Association first developed this equipment during the 1934 contest. The combination transmitter and receiver used weighs slightly over five pounds and the wavelength is five metres.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



AT NEWCASTLE : The buildings on the new Woosington Aerodrome, which is being opened to-morrow by the Secretary of State for Air, consist of a hangar with the necessary workshops and of an extremely attractive clubhouse which has three bedrooms for the use of visiting pilots.

THE WEEK AT CROYDON

Sensible Passengers : The Health of Pilots : When is a Cat Not a Cat?

THE series of misfortunes which has overtaken K.L.M. has not, it is interesting to note, affected bookings out from Croydon. I hear of a few cancellations, which is quite natural in the circumstances, but the regular business travellers are flying to and fro as usual. Air travellers to-day take the same point of view about accidents as rail travellers have always taken; they are convinced that the company takes every care of their safety which it is humanly possible to take.

According to the newspapers, a member of Holland's Parliament asked whether K.L.M. pilots fly too much. M.P.s are much the same everywhere; they seldom have much knowledge of things they are so apt to discuss. Recently at Croydon I met Dr. Slotboom, the K.L.M. medical officer, who told me that if one of the company's pilots shows any sign of flying fatigue or physical disability of a temporary sort, such as 'flu, which might impair his flying efficiency, he is promptly sent on leave for a week or more. Often the pilot himself thinks he is perfectly fit, but he goes on leave nevertheless. I believe K.L.M. is the only company (in Europe, anyway) with its own medical officer.

A Feline Poser

One of the companies had a curious assortment of tropical birds, beasts and reptiles consigned to the London Zoo last week. Among them was a civet cat, and the question arose among the Customs zoologists: "When is a cat not a cat?" All dogs, cats and animals of the feline species are liable to six months' quarantine on entering this country, and the importers are liable to an enormous fine if permission to land has not been obtained in advance from the Board of Agriculture and Fisheries. Finally it was discovered that a civet cat is not feline, and the animal was released without a stain on its character.

Olley Air Service, Ltd., reports an overwhelming amount of special charter work, mostly to Continental pleasure resorts, and the company's Deauville air service is becoming extremely popular. At home, there is a constant demand for specials to race meetings all over the country by jockeys and trainers. An interesting job which Olley is doing at present is a regular flight from Newcastle to London every morning from Monday to Friday for a big company with works in the North of England. Technical experts leave Newcastle about 6 or 6.30 a.m., and arrive in London for breakfast, spend the morning in consultation with their London directors, and fly back in the

early afternoon, reaching the works again by about 3 p.m.

Croydon, I discover, was to the fore in transport matters long before civil aviation was thought of. One of the first iron railways was constructed from Wandsworth to Croydon in about 1803, and the wagons were horse-drawn. In 1805 one horse drew twelve three-ton wagons—thirty-six tons in all—for six miles with ease to the turnpike at Croydon. How many horses does it take to shift thirty-six tons from Croydon by air to-day?

To my horror, I found that some slip of the pen or typist's error had caused me to say in cold print last week in these notes something I had not the slightest intention of saying. Talking about three-motor planes occasionally making trips, such as that from the English coast to Croydon, on two engines when fully loaded, I was made to say "when fully loaded and even more than fully loaded." Nothing was further from my thoughts, for in commercial aviation the Plimsoll line is an even more sacred matter than it is at sea. Every aeroplane, British or foreign, has a Government-fixed maximum permissible paying load. The load list, that most important of documents, is checked and counter-checked and signed by a responsible official of the company as well as by the pilot. A traffic manager signing for an overload might as well sign his resignation from his company, and a pilot countersigning such an unusual document would be a maniac, despite the fact that practically all big commercial planes have a reserve of power enabling them to take off with more than their maximum load.

A. VIATOR.

Two Plans

DURING the past year various plots have been hatched for the opening of a flying-boat service down the west coast of Africa, and last week the project appeared again in large type. The idea of West African Airways, Ltd., is to link up with the French or Belgian Saharan service and also to run feeder lines inland from the flying boats on the coast. Enquiries suggest that the project, or projects, are still very much in embryo.

Another scheme is being promoted, it appears, by Mr. and Mrs. H. B. Tate and by Sqn. Ldr. Wingfield-Smith to use flying boats for services to New York via the Azores and Bermuda, and for short services between Cherbourg, Copenhagen, Lisbon, and Gibraltar. Australia and South Africa are included in the plans. We shall see.

HESTON NOTES

Opening of the Giant Hangar : Other Important Constructional Developments : "ZZ" Landing Experiments

ON Friday last Sir Philip Cunliffe-Lister, Secretary of State for Air, formally opened the Airwork Central Repair Station at Heston.

This huge building covers a floor area of 60,600 sq. ft. On the ground floor are workshops, paintshop, stores and ancillary accommodation, while the administrative offices of Airwork, Ltd., are on the first floor. The hangar itself provides 32,450 sq. ft. of unobstructed floor space with a doorway having a clear span of 200ft. by 30ft. high. The workshops, arranged round three sides of the hangar include cleaning room, engine shop, normalising room, tinsmith shop, fitting shop, woodwork shop, fabric shop, battery and electrical equipment rooms, inspection rooms, first-aid room, and paintshop. This last is entirely separated from the rest by a fireproof door, and, of course, is ventilated most thoroughly.

The building, which can truly be described as an amazing piece of work, was designed by Messrs. Norman, Muntz and Dawbarn, the steelwork framing is the work of Boulton Paul, Ltd., and the contractors are McLaughlin and Hardy.

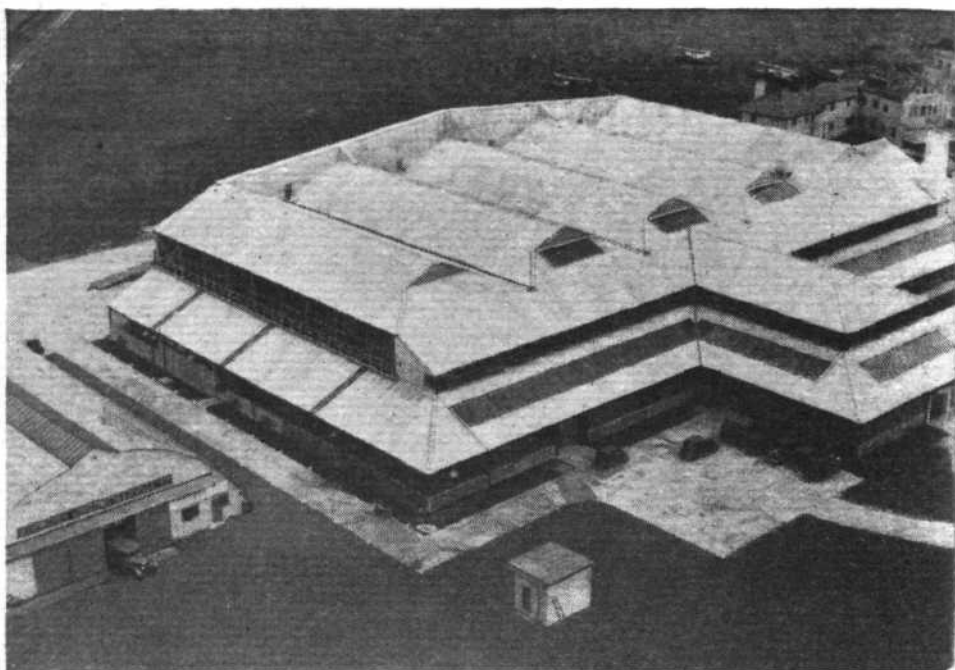
Among other extensions, apart from this new building, the aerodrome landing area has been increased by some forty-five acres, and a new block of offices has been built which will accommodate those handling the passenger traffic of the companies operating to Jersey, Isle of Wight, Scotland and Blackpool.

A runway is also being constructed upon which it is proposed to experiment with the landing of aeroplanes in zero visibility conditions. This will be the first wireless-controlled landing experiment on a commercial aerodrome in this country, and the results, if successful, should have a far-reaching effect on the future of Heston. Mr. R. P. G. Denman, a director of Airwork, Ltd., which controls and operates Heston, is himself a wireless expert.

A Busy Flying Week

Last week P.S. and I.O.W.A. ran two, three and even four machines on each service, with passengers for the Naval Review. The 7 o'clock service from Heston was run on one occasion with four machines, and an interesting point is that some 4,000 lb. of freight, mainly newspapers, was carried in connection with the Review. In the week ended July 17, 230 passengers were carried by the company between Heston and the Isle of Wight.

Mr. Keith Miller, in charge of the Heston offices of Commercial Air Hire, Air Dispatch and the Inner Circle, reports



This *Flight* photograph, taken from the air, shows the impressive appearance of the new hangar-cum-workshop-cum-administrative building. The view is of the rear of the structure ; at the front are the large hangar doors.

good business on these three allied airlines. The recent heat wave imparted double magnetism to the yellow sands of Le Touquet, and Air Dispatch was obliged to run a duplicated service with full loads on the sixteen-seater Avro 642. No fewer than eight extra services were put on the Inner Circle Air Line between Croydon and Heston during the week-end.

It was with mixed feelings that the pilots of Commercial Air Hire, Ltd., surveyed the company's Avro 642 after several trips to Spithead for the Fleet Review.

In their efforts to miss nothing of the spectacle, enthusiastic sightseers had pushed their heads right through the specially constructed safety windows of the pride of Commercial Air Hire's fleet of aeroplanes.

In spite of the fact that repairing the windows necessitated a certain expenditure of money and labour, it is extremely gratifying to know that for passengers to be trapped in this type of machine is a sheer impossibility. With very little effort every one of the twenty-four side windows in the passenger compartment can be instantly used as an emergency exit. In addition to these side windows, there are four large windows in the roof.

On Saturday an urgent charter was organised by Airwork at Manchester and carried out by Birkett Air Service in very quick time. The passenger, a Dutchman, who had received severe injuries to his hand while competing in the Manchester Wheelers' cycle races, was rushed out to the Manchester Airport by car. Birkett Air Service, in response to Airwork's telephone call, left Heston at 3 p.m., collected the passenger at Manchester at 4.30, cleared customs at Heston at 6, and reached Amsterdam by 8.30.

An Improved Boulton Paul

ABOUT four months ago Imperial Airways took delivery of two examples of the Boulton Paul P.71A high-speed, medium-capacity biplane. The type was fully described in *Flight* of January 31, 1935. The engines installed in the Imperial machines were Siddeley "Jaguar VI AAs," and these allow a cruising speed of about 150 m.p.h.

For their standard model of the P.71A the manufacturers have selected two Bristol "Pegasus III" geared and medium-supercharged nine-cylinder radials rated at 690 h.p. at 3,500ft. This is of special interest because these engines use fuel of 87 octane number, as yet almost unknown in British commercial aviation. An appreciable proportion of the excellent performance attained by certain American commercial types, of course, may be attributed to the use of such fuels.

With its new power plant the machine will have a maximum speed of 195 m.p.h. at 5,000ft., and will cruise at the same altitude, on two-thirds full power, at 166 m.p.h. Compared with some contemporary foreign transports of similar power, it may appear to have a somewhat limited disposable load (4,000 lb.), but its comparatively low-wing loading is an advantage for operation from confined spaces. For take-off and landing the runs are both under 200 yards. The rate of climb to 5,000ft. is no less than 1,450ft./min. On one engine a ceiling of 5,000ft. may be maintained; the service ceiling, with both engines, is 25,000ft.

Cruising at 166 m.p.h. the range is 700 miles, but by throttling back to 130 m.p.h. this may be increased to 900 miles.

A New Hedon?

IT appears that the Hull Airport Committee has decided to lay out a new aerodrome in place of Hedon, which, bordered on one side by a main road and on another by a railway, is considered to be incapable of suitable expansion. The new aerodrome will, it is stated, be a mile square.

Another Asiatic Opening

AN airline between Ashkhabad and Tashkent, Central Asia, and passing over the Kara-Kum Desert, was recently opened by the Administration of the Soviet Civil Air Fleet.

Another between Tamdi and Turtkul, Kara-Kalpakia, will be opened in the near future.

The Hull—Amsterdam Service

THE report which has appeared in a number of newspapers to the effect that one of the K.L.M. services suspended owing to shortage of pilots is the Hull-Amsterdam is, apparently, unfounded. It is understood that the service is to be continued until October 6, when the matter of running it throughout the winter will be considered.

Floodlights at Bristol

THE Whitchurch expansions and improvements include, as was explained last week, the installation of full electrical night landing equipment. The floodlight to be used is of G.E.C. manufacture, and is similar to that now installed at Cardiff. Recently, it will be remembered, the same company re-equipped Croydon with eight boundary floodlights.

Coventry's Airport

AT long last the Coventry airport scheme has been passed and a site has been selected. This site is actually the one discovered by the Coventry and Warwickshire Club, and is very near to the Armstrong-Whitworth aerodrome at Whitley. Armstrongs, incidentally, have a ten-year monopoly of building sites on the new aerodrome.

New Zealand Orders D.H.86's

UNION Airways and Cook Strait Airways have recently ordered three D.H. 86's and two "Dragon Rapides," respectively, for service in New Zealand.

The Union Steamship Company of New Zealand, Ltd., holds the controlling interest in Union Airways and is associated with Cook Strait Airways. The former will operate a daily service between Wellington, Blenheim, and Nelson, and the latter between Palmerston North and Dunedin via Blenheim and Christchurch.

New Madagascar Equipment

THE christening of a new Marcel Bloch Type 120 three-engined "colonial"-type machine, which will shortly be put in operation on the Broken Hill Antananarivo (Madagascar) route, took place at the Le Bourget Airport last week. The traditional bottle of wine was broken by the wife of the Air Minister, General Denain, who christened the machine *Ville de Tananarive*.

At the luncheon it was pointed out that up to July 4 of this year the machines of Le Service de la Navigation Arienne Madagascar, which make a postal connection with the Imperial Airways' service at Broken Hill, have covered some 153,125 miles in 1,800 hours of flying. More than 2,640 lb. of postal matter (210,000 letters) have been transported, and over ninety crossings of the Mozambique Canal have been effected. About 2,000 letters are now being transported weekly. The service, which was described in *Flight* of May 10, 1934, operates weekly, and it is possible that passengers will be carried in the new machines when these are put into service. At present S.P.C.A. Type 41 T high-wing monoplanes are used, with three Salmson engines of 135 h.p. each. These have a speed of about 120 m.p.h. at ground level, with a flight radius of 625 miles, and are not equipped to carry passengers.

The new Bloch has three Lorraine "Algol" engines, each of 300 h.p., and has a maximum speed of 155 m.p.h. at ground level, with a cruising speed of 131 m.p.h. It is equipped to transport seven passengers and 660 lb. of postal or other freight. It is hoped to make other additions to the present equipment very shortly.



At the official opening of Ramsgate's new airport, described in the paragraph below—the Mayor receives Capt. Stack.

London, Ramsgate and Ostend

LAST Thursday the Mayor of Ramsgate met the first machine operating on Hillman's new Essex Airport, Ramsgate and Ostend service, and later made a flight with Captain Neville Stack to Ostend.

Four trips each way will be made daily by Hillman "Dragons" to La Zoute aerodrome, which serves Ostend.

At a luncheon given by the Mayor of Ramsgate to celebrate the inauguration of the service it was announced that the company which operates Ramsgate's new airport has been registered as "Ramsgate Airport, Ltd." The directors are Mr. Whitney Straight, Mr. Richard Seaman, and Mr. Gwatkin.

Also present at the luncheon was a representative of Crilly Airways, which company is doing a certain amount of flying from the airport at week-ends.

Captain Stack congratulated Ramsgate on its airport. Although, perhaps, it was a bit small, he said, the surface was second to none in the country, and he would have no hesitation in landing any type of machine there.

Duplication all the Way

THERE is a strong possibility that the Australian section of Imperial Airways' service will be duplicated in the not-so-distant future. The traffic between Singapore and Brisbane has grown to such an extent that Quantas Empire Airways and the Australian Government are discussing the question. If this is done, then Imperials will also duplicate their part of the service between Calcutta and Singapore.

Wind Indication at Heston

A NOTICE TO AIRMEN states that, as from July 22, the airship-shape indicator in the south-east corner of Heston aerodrome has been removed. Wind-socks are flown from the flagstaff on the control tower and from the north end of the hangar near the north-west corner of the aerodrome. When there is no wind, a white landing "T" is placed on the ground in front of the control tower. This indicates the direction for landing and take-off parallel to the white line described in Notice to Airmen No. 8 of 1935.

Crilly Services for Liverpool

MR. F. LEO CRILLY, of Crilly Airways, Ltd., visited Speke last Monday in one of the firm's "Dragons," and was met by the Liverpool city surveyor, Mr. Albert D. Jenkins. At a conference which followed it was decided to inaugurate a new service on August 6, linking Liverpool with the Midlands.

By this means Liverpool will be placed in direct contact with Norwich, Leicester and Nottingham by a twice-daily service. Machines will arrive at Liverpool at about 11 15 each day to link up with the Belfast, Isle of Man, and Blackpool services, and depart fifteen minutes later with passengers for the Midlands. The afternoon machines will arrive at 3.45 and return at 4 p.m.

THE INDUSTRY

Westland Aircraft, Ltd.

PREVIOUSLY known as the Westland Aircraft Works, the aircraft manufacturing branch of Petters, Ltd., at Yeovil, has now been formed into a public company, with the title of Westland Aircraft, Ltd. Last Monday an offer was made to the public of 500,000 ordinary shares of 5s. each at 7s. per share. The directors of the new company will be Sir Ernest Petter (chairman and managing director), Capt. P. D. Acland (joint managing director), Air Vice-Marshal N. D. K. MacEwen and Mr. W. E. W. Petter. The company is said to have on hand orders amounting to £300,000.

A Big American Merger

A DEVELOPMENT which will consolidate into one company the Pratt and Whitney Aircraft Co., Hamilton Standard Propeller Co., Chance Vought Corporation, and Sikorsky Aircraft Corporation, is the formation of the United Aircraft Manufacturing Corporation.

The United Aircraft Corporation, formerly the parent company of the group, will now be parent company of the United Aircraft Manufacturing Corporation and United Aircraft Exports Corporation. This has been brought about with a view to simplification of the structure, as, instead of the seven companies, each with its own offices, directors and stockholders, there will now be only three active companies in the group.

Mr. D. L. Brown is the president of the new corporation, and Mr. Eugene E. Wilson is the senior vice-president. Mr. Brown also continues as joint executive and Mr. Wilson as vice-president of the United Aircraft Corporation. Moreover, they will also serve as general managers of Pratt and Whitney Aircraft and Chance Vought Aircraft respectively.

Mr. C. W. Deeds, vice-president of United Aircraft Manufacturing Corporation, will retain his presidency of the United Aircraft Exports Corporation.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

THE HAWKER SIDDELEY AIRCRAFT COMPANY, LTD., was, as already reported in *Flight*, registered as a "public" company on July 11, with a nominal capital of £2,000,000 in 1,000,000 5 per cent. cumulative preference shares of £1 each, and 4,000,000 ordinary shares of 5s. each. Objects: To acquire all or any of the issued share capital of the Armstrong Siddeley Development Company Ltd., and Hawker Aircraft Ltd., to adopt an agreement between T. O. M. Sopwith, F. Sigrist and F. S. Spriggs of the third part, and C. P. Heselden (for this company) of the fourth part; and to carry on the business of manufacturers, designers and constructors of and dealers in aircraft, etc. Directors: T. O. M. Sopwith, P. E. Hill, F. Sigrist, F. S. Spriggs. Solicitors: Simmons and Simmons, 1, Threadneedle Street, London, E.C.

SILENTBLOC LTD., was registered as a "public" company on July 9, with a nominal capital of £50,000 in 2s. shares. Objects: To adopt an agreement with André (Silentbloc) Ltd., and to carry on the business of manufacturers of and dealers in shock-absorbing devices, vehicles of various kinds, etc. Directors: Theodore B. André, Vernon A. Trier, M.I.A.E., Harold V. Strong, William L. Harris. Solicitors: Herbert Smith and Co., 62, London Wall, London, E.C.2, and Henry Mossop and Syms, 11, Lincoln's Inn Fields, London, W.C.2.

BRITISH AERO-MARINE CONSTRUCTORS LIMITED was registered as a "private" company on July 13 with a nominal capital of £100 in 5s. shares. Objects: To carry on the business of manufacturers of and dealers in flying boats, seaplanes and aircraft of all kinds, and the component parts, etc., etc. Solicitors: Clifford-Turner and Co., 11, Old Jewry, E.C.



FOR QUICK REFUELLING: Taken at Mildenhall on the occasion of the review of the Royal Air Force by His Majesty the King, this photograph shows a row of the new Zwicky refueling units, which are capable of delivering fuel at a very high rate. (*Flight* photograph.)



ART IN INDUSTRY: the new De Havilland factory is a building of dignified beauty, a fitting birthplace for aircraft of equally pleasing appearance. This is the entrance to the administration offices. The finish is in white, green and grey-green; the building is of reinforced concrete by the Trussed Concrete Steel Co., and the architects were James M. Munro and Sons.

SOUTHEAST FLYING CLUB LTD. "Private" company. Registered July 12. Capital £100 in 5s. shares. Objects: To establish a club to provide facilities for members to be instructed in and practise flying, etc. Directors: Gustavus E. Weber, Henry Clarke, Brian S. Allen, Sydney S. Sylvester, Angus S. Bowers, Harold D. Rankin. Registered office: The Aerodrome, Rochford.

INCREASES OF CAPITAL

BROOKLANDS AIR TAXIS LTD., Brooklands Aerodrome, Byfleet, Surrey.—The nominal capital has been increased by the addition of £1,000 beyond the registered capital of £1,300. The additional capital is divided into 1,000 6 per cent. non-cumulative preference shares of £1 each.

UNIVERSAL AIRCRAFT SERVICES LTD., 6, Broad Street Place, London, E.C.2.—The nominal capital has been increased by the addition of £1,500 beyond the registered capital of £1,000. The additional capital is divided into 300 preference, 1,000 "A" ordinary and 200 ordinary shares, all of £1.

WESTLAND AIRCRAFT LTD., Westland Aircraft Works, Yeovil.—The nominal capital has been increased by the addition of £240,900 beyond the registered capital of £100. The additional capital is divided into 990,600 ordinary shares of 5/- each. The company has also been converted into a public one. Directors: Sir Ernest W. Petter (director of Petters Ltd.), Capt. Peter Dyke Acland, A.V.-M. Norman D. K. MacEwen, C.B., C.M.G., D.S.O.; Wm. E. W. Petter (director of Petters Ltd.). P.C. Strang is acting secretary.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

Published July 25, 1935.

- 33147. THURSTON, A. P. Method and means for reducing the resistance of air-cooled engines and like obstructions on aircraft (430,905).
- 33457. MILES, G. H. Optical projection apparatus (431,049).
- 36099. PETTERS, LTD., BRUCE, R. A., and A.T.S. CO., LTD. Metal beams (430,759).
- 36698. SUPERMARINE AVIATION WORKS (VICKERS), LTD., and BLACK, A. Aircraft (431,067).
- 38. COATS, A. G., and HAFNER, R. Control levers for aircraft or similar rocking lever devices in control mechanism (431,071).
- 1100. NORTON, J. B. Landing gear for aircraft (430,831).
- 8037. DUNLOP RUBBER CO., LTD., GOODYEAR, E. F., WRIGHT, J., and TREVASKIS, H. Aeroplane brakes and their controls (430,842).
- 9898. DUNCANSON, F. Wing structures for aircraft (431,089).
- 17028. BOULTON PAUL LTD., and NORTH, J. D. Aircraft (430,859).
- 30751. UTM, S., and ARNOLD, F. Aircraft (430,793).
- 34062. UNITED AIR LINES, Inc. Device for removing ice from structures, such as aeroplane wings, exposed to ice forming conditions (430,802).
- 35591. SPERRY GYROSCOPE CO., Inc. Gyroscopic stabilisers (430,886).
- 6233. DOWTY, G. H. Tail wheels and the like for aircraft (431,042).